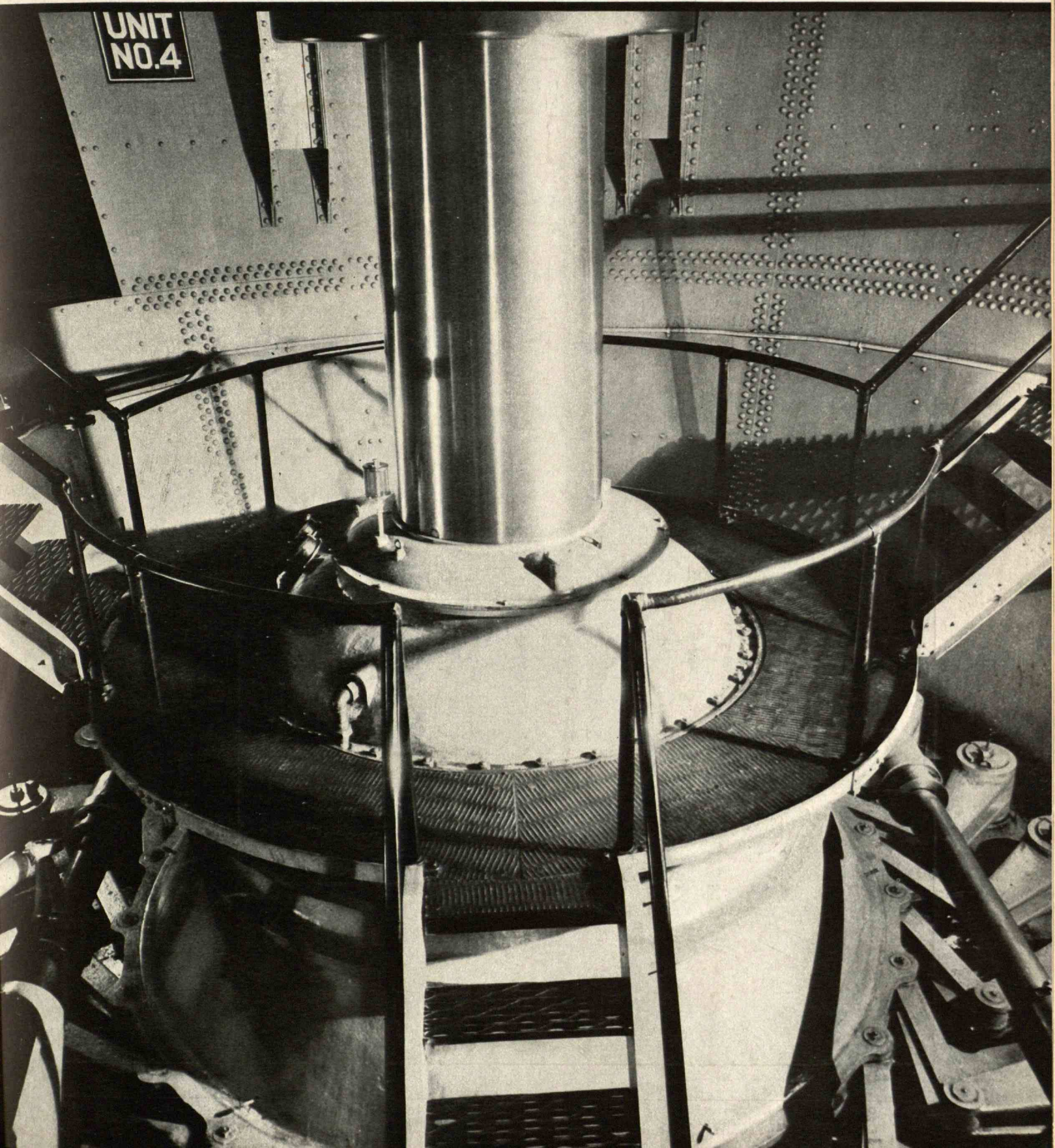


November 1934

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



technology review

Published by MIT

This PDF is for your personal, non-commercial use only.
Distribution and use of this material are governed by copyright law.
For non-personal use, or to order multiple copies please email
permissions@technologyreview.com.

I'm no dirt farmer
but I was brought up on a
tobacco farm and I know
mild ripe tobacco...
have a Chesterfield

*Down where tobacco
is grown folks say . . .*

"It's no wonder that so many people
smoke Chesterfield cigarettes.

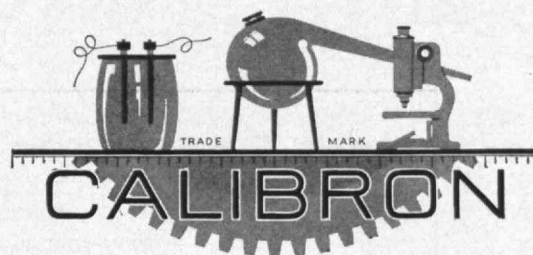
"To begin with they buy mild ripe
tobacco . . . and then they age it.

"It costs a lot of money . . . but
it's the one way to make a milder, bet-
ter-tasting cigarette."

THE TABULAR VIEW

WHEN Francis Bacon drew his unfinished plan for an ideal commonwealth ("The New Atlantis," circa 1623) the principal feature he described was Salomon's House, a great foundation of arts and sciences. The objective of this foundation was the "knowledge of causes, and secret motions of things; and the enlarging of the bounds of human empire, to the effecting of all things possible." Among its "Preparations and Instruments" were "houses of deceits of the senses; where we represent all manner of feats of juggling, false apparitions, impostures, and illusions; and their fallacies. And surely you will easily believe that we that have so many things truly natural which induce admiration, could in a world of particulars deceive the senses, if we would disguise those things and labour to make them seem more miraculous. But we do hate all impostures, and lies; inasmuch as we have severely forbidden it to all our fellows, under pain of ignominy and fines, that they do not show any natural work or thing, adorned or swelling; but only pure as it is, and without all affectation of strangeness." ¶ Two centuries after Bacon, technological institutions strikingly similar in their characteristics to Salomon's House began to be formed and the great Faraday appeared as an ideal embodiment of that type of investigator which Bacon called Benefactor. Faraday even interested himself in deceits of the senses. His investigation of table-turning and table talk, which Mrs. KATHARINE MAYNARD describes on page 60, is an item in point. Mrs. Maynard is Vail Librarian at M.I.T. She will be recalled as the author of an article on the history of the balloon, published by The Review in April, 1928, and a second article on Oliver Heaviside, published in March, 1933.

LAST January The Review presented a discussion of the mathematical theory of probability as applied to the game of bridge. The article received a great accolade in the form of comment and discussion, with the result that The Review requested its author, Professor L. F. WOODRUFF, '18, to prepare the sequel which appears on page 61. Professor Woodruff is an able mathematician and electrical engineer and his interest in bridge comes by way of avocation. He holds degrees from Georgia Tech, M.I.T., and Harvard. Plans have been made for a joint book by him and Ely Culbertson on mathematical probability as applied to bridge. ¶ ALBERT W. DUNNING, '32, after leaving the Institute, spent a period flying with the Navy. During fleet maneuvers off the coast of Mexico, he was forced down at sea and spectacularly rescued by means of a rubber boat dropped to him from a plane — the only time such a rescue has ever been made. His pictures on pages 58 and 59 were taken during his career in the Navy. ¶ The new department, "Bending Moments," which appears on page 67 is what *Punch* calls a charivari ("a mock serenade of discordant noises"). It will appear occasionally.



GUARANTEED RESEARCH

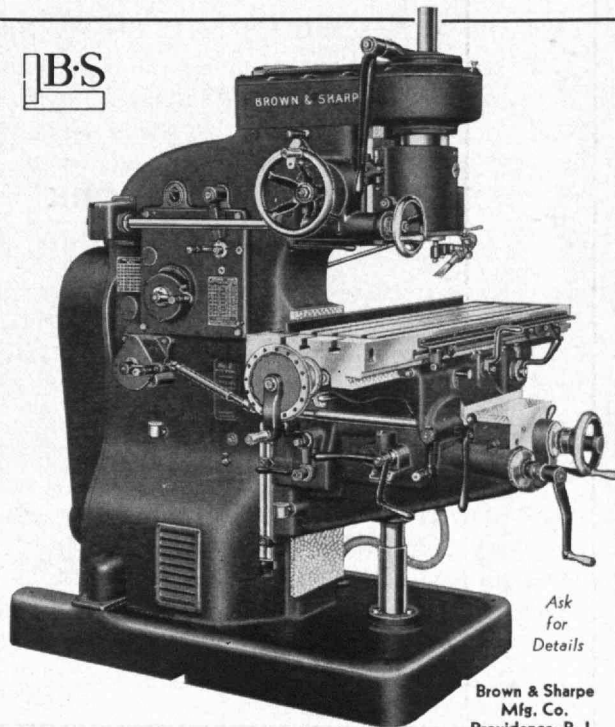
- A definite price for successful results. There is no charge unless your requirements are met.
- Mechanical and Electrical Engineering . . . Developments, models, production and testing.

CALIBRON PRODUCTS, INC.

West Orange



New Jersey



Ask
for
Details

Brown & Sharpe
Mfg. Co.
Providence, R. I.

A New High Speed Vertical—
**Brown & Sharpe No. 2 High Speed
Vertical Spindle Milling Machine**

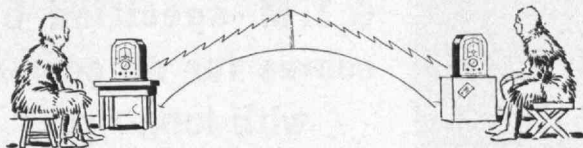
HAYDEN, STONE & Co.

BANKERS

NEW YORK

BOSTON

G-E Campus News



TWO POLES IN ONE

Radio entertainment and "airmail" have been sent to the Antarctic through General Electric's short-wave station W2XAF, ever since Rear Admiral Byrd arrived there last year. Recently, in conjunction with a Byrd program, another was sent out to Rockwell Kent and his son in the Arctic region—thus linking simultaneously Americans who are, in the matter of latitude, farthest apart. Governor McNutt of Indiana and other prominent Hoosiers spoke to the Byrd Expedition from Indianapolis in a program sponsored by the *Indianapolis Star*. Immediately afterward, the Coffee House Club, an organization of artists and writers to which Rockwell Kent belongs, sent music and greetings from New York to him on the island of Ubekjent, just off the coast of Greenland, 600 miles within the Arctic circle. Features of this program were special greetings from Mrs. Kent and her daughter, and a talk in the Eskimo language by Vilhjalmar Steffanssen, Arctic explorer, for the benefit of the natives. Both programs were broadcast over a coast-to-coast NBC network as well as by short waves.



GOOD-BYE, SMOKESTACK

For many years, the old central heating plant at Mt. Holyoke College in Massachusetts, with its tall, unsightly smokestack, barred the way to certain necessary improvements and landscape developments on the campus. This summer the old boilers and the smokestack were torn down. In one of the buildings of the old plant stand 120 General Electric oil furnaces arranged in circular groups of five. Fifty-two more G-E oil furnaces are installed in the smaller or more isolated buildings of the campus, operating singly, in pairs, and, in one instance, in a battery of 10. In the central plant, only as many groups of

furnaces will operate as are necessary to maintain the required steam pressure. The remainder will be shut down, avoiding stand-by losses. The individual furnaces and small groups in distant buildings permit the abandonment of some of the longer runs in the underground steam-distribution network. The high efficiency of the system is expected to produce savings which will pay for the installation in five to seven years. In addition, as a result of the more careful regulation of temperature, it is expected that health conditions at the college will be considerably improved.

The main plans for the system were drawn up by C. W. Colby, consulting engineer. D. W. McLenegan, Wisconsin, '21, assistant engineer of the Air Conditioning Department; W. O. Lum, and H. R. Crago, Penn State, '18, both of the same department, handled engineering details for General Electric.



FLYING POWER PLANT

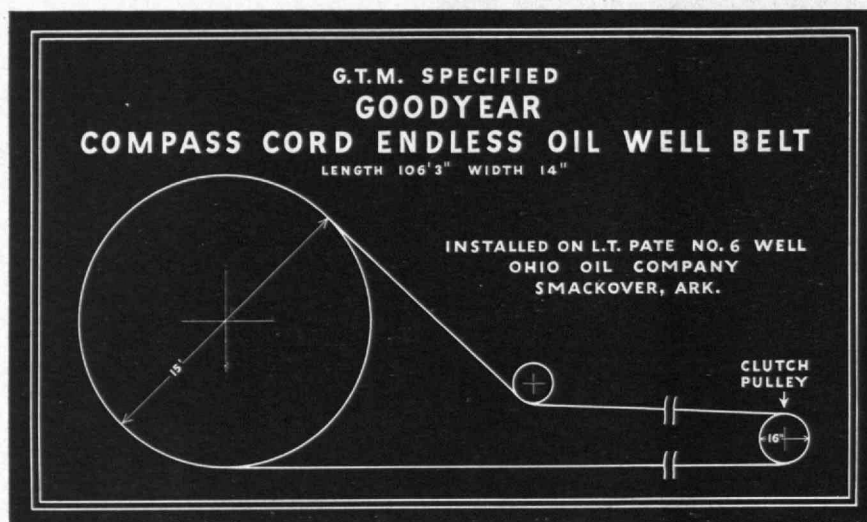
Gold was discovered in 1925 along the Bulola River in New Guinea, an island just north of Australia. Prospectors worked the richer veins by hand methods, and packed their "take" on the backs of natives through 40 miles of cannibal-infested and nearly impassable jungles to Lae on the coast. After the best veins had been worked out, it became apparent that placer operations on a large scale would pay if the necessary dredges and other machinery could be brought to the location. Land transportation was impossible, so a plane was sent in. The pilot found a spot to land, and a flying field was cleared off.

Four 875-kv-a. General Electric waterwheel generators were among the equipment ordered. When they arrived at Lae, they were transferred to huge all-metal Junkers freight planes and flown to the location piece by piece. The largest single pieces had a net weight of 6545 pounds. As the load limit of the planes is 7000 pounds, it was a tight squeeze. D. B. Gearhart, Iowa State, '27, of International General Electric, Inc., handled the order for the Company.

96-83DH

GENERAL  ELECTRIC

OHIO WINS—33 TO 5!



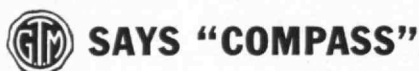
**G.T.M.-specified belt
scores for oil company
with long "run"**

**Has been operating continuously
for 33 months; previous belt broke
five times in 5 months**

THE dollar-and-cents wisdom of buying belts *correctly designed for, and accurately fitted to* your particular set-up, is strikingly illustrated by the experience of The Ohio Oil Company, of Findlay, O.

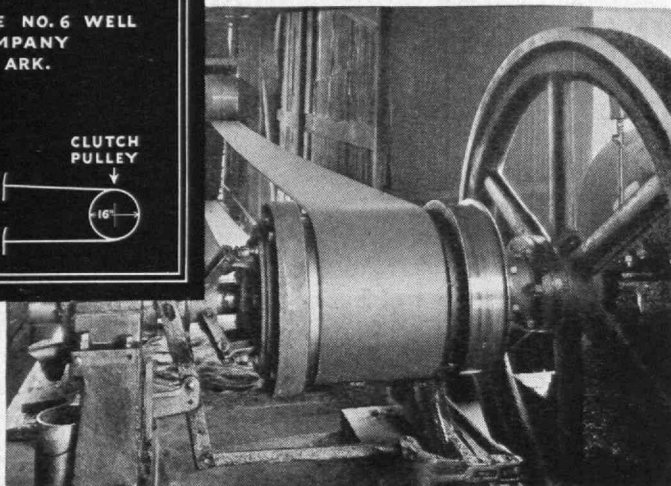
Back in 1931, the belt on the pump of its L. T. Pate No. 6 Well in the Smackover Field, Arkansas, had broken five times in less than five months' service, and had been cut seven times to take up stretch.

Things couldn't go on like that! Breakdowns and delays cost too much money. So the G. T. M. — Goodyear Technical Man — was called in.



This practical expert made his usual careful study of operating conditions. Analyzed load fluctuations, and finally recommended a double-deck construction Goodyear Compass Cord Endless Belt, 106' 3" long by 14" wide.

This belt was installed on December 19, 1931, and



Still going strong after 33 months' continuous service

has been running continuously 24 hours a day ever since, except for an occasional shut-down of an hour or two due to causes other than belt trouble.

Today this belt is still delivering the goods after 33 months' trouble-free service — *more than six times longer service than the previous belt*, to say nothing of the saving in replacement costs!

Savings like this explain why so many industries consult the G.T.M. regularly on their belting, hose and other mechanical rubber goods requirements. Why not see what he could do for you? A line to Goodyear, Akron, Ohio, or Los Angeles, California, or the nearest Goodyear Mechanical Rubber Goods Distributor, will bring him promptly.

**BELTS • MOLDED GOODS
HOSE • PACKING**

MADE BY THE MAKERS OF GOODYEAR TIRES

THE GREATEST NAME  IN RUBBER

GOODYEAR





Fred G. Korth

THE TECHNOLOGY REVIEW

Title Reg. U. S. Pat. Office

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VOL. 37, NO. 2

CONTENTS

NOVEMBER, 1934

THE COVER	from a photograph by WILLIAM RITTASE	
REFRACTED LIGHT	FRONTISPIECE	50
<i>From a photograph by Edward Quigley</i>		
BEWARE THE PROPELLER!	Illustrations by ALBERT W. DUNNING	58
<i>Fleet Flying with a Camera</i>		
FARADAY INVESTIGATES TABLE-TURNING	By KATHARINE MAYNARD	60
<i>A Curious Footnote to the Life of the Discoverer of Electro-Magnetic Induction</i>		
MATHEMATICS AND BRIDGE	By L. F. WOODRUFF	61
<i>Probability and its Practical Limitations</i>		
<hr/>		
THE TABULAR VIEW		45
<i>Notes on Contributors and Contributions</i>		
THE TREND OF AFFAIRS		51
<i>News of Science and Engineering</i>		
THE INSTITUTE GAZETTE		64
<i>Relating to the Massachusetts Institute of Technology</i>		
BENDING MOMENTS		67
MAIL RETURNS		70

Editor
J. RHYNE KILLIAN, JR.

TENNEY L. DAVIS

Publisher
HAROLD E. LOBDELL

Editorial Associates
JOHN J. ROWLANDS

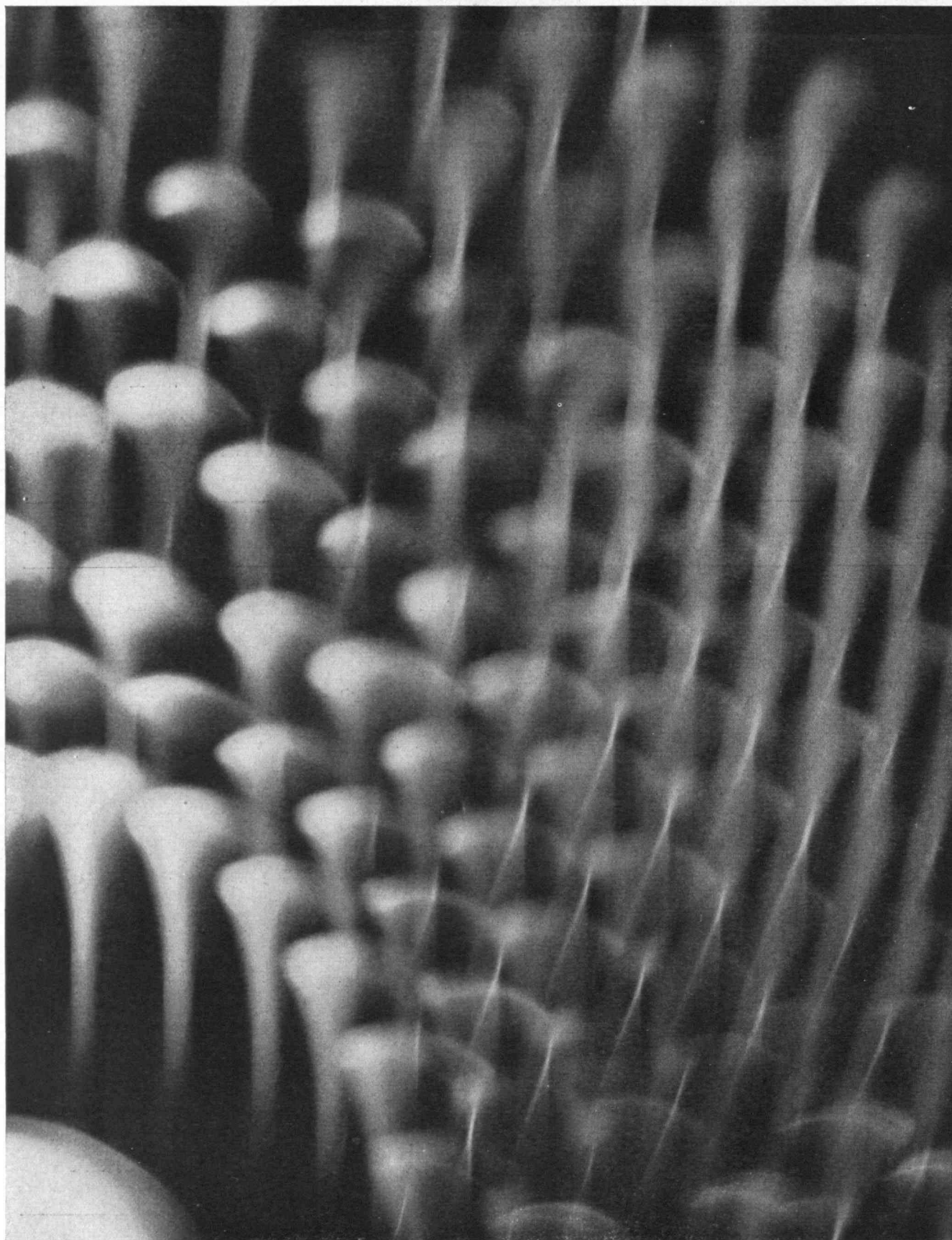
Business Manager
RALPH T. JOPE

JOHN E. BURCHARD, 2ND

PUBLISHED MONTHLY FROM OCTOBER TO MAY INCLUSIVE AND IN JULY ON THE TWENTY-SEVENTH OF THE MONTH PRECEDING THE DATE OF ISSUE AT 50 CENTS A COPY. ANNUAL SUBSCRIPTION \$3.50; CANADIAN AND FOREIGN SUBSCRIPTION \$4.00. PUBLISHED FOR THE ALUMNI ASSOCIATION OF THE M. I. T. CHARLES E. SMITH, PRESIDENT; EDWARD L. MORELAND, MARSHALL B. DALTON, VICE-PRESIDENTS; CHARLES E. LOCKE, SECRETARY; J. RHYNE KILLIAN, JR., TREASURER.



PUBLISHED AT THE RUMFORD PRESS, 10 FERRY STREET, CONCORD, N. H. EDITORIAL OFFICE, ROOM 11-203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE A, MASS. ENTERED AS SECOND-CLASS MAIL MATTER AT THE POST OFFICE AT CONCORD, N. H. COPYRIGHT, 1934, BY THE ALUMNI ASSOCIATION OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY. THREE WEEKS MUST BE ALLOWED TO EFFECT CHANGES OF ADDRESS. BOTH OLD AND NEW ADDRESSES SHOULD BE GIVEN.



Refracted Light

Edward Quigley

THE TECHNOLOGY REVIEW

Vol. 37, No. 2



November, 1934

The Trend of Affairs

Western Thrillers

WHICH of the tremendous engineering projects now moving smoothly toward completion between the Mississippi and the Pacific is most likely to stir the imagination 20 years hence as does today the ditch at Panama — the waterway through which the *Anconia*, first of a majestic procession of more than 80,000 vessels, passed on August 15, 1914?

Will it be Boulder Dam, into which the two-millionth cubic yard of concrete was slipped last midsummer with another million promised by Christmas? Grand Coulee? Either of the mammoth bridges at San Francisco? Or the \$200,000,000 Colorado Aqueduct, with its tunnel driving going ahead at a rate of nearly two miles a month — an aqueduct conceived to take from a river fluid too thick to drink and too thin to plow and deliver it crystal clear 240 miles away for the two-and-a-half-million folks who will, it is supposed, in due course of time, have taken up abode in the Los Angeles area?

RIGHT now Boulder Dam still commands favorable odds. All the western projects are notable for the excellence and audacity of their engineering and thus sheer dimensions may be expected to count heavily in the final judgment. Being 726 feet high ought to let Boulder keep the title of world's highest dam

for at least 20 years after its completion. That designation kept the similarly arched gravity type, 349-foot Arrowrock, built for irrigation purposes in Idaho, on front pages nearly ten years until 1924. Then the straight gravity, 362-foot Swiss Schraeh or Waegital (part of a power development for Zurich) came along. Today only four dams in the United States surpass the height of Arrowrock: 358-foot Pardee and 372-foot Pacoima in California, 389-foot Diablo (built by Seattle as part of the Skagit River venture), and 405-foot Owhyee in northeastern Oregon which, in type and purpose the same as Arrowrock, belongs also to the U. S. Reclamation Service.

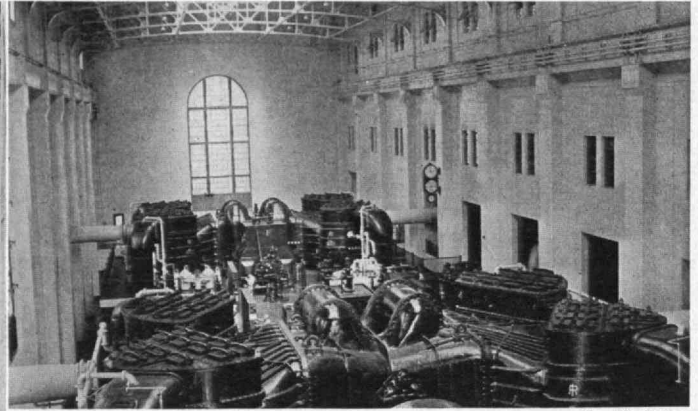
Owhyee, world's highest for two years past, will soon yield to the thin constant-angle arch of the 446-foot Sautet, power dam of *Forces Matrices Bonne et Drac*, near Mens, France. But the Sautet, located in an extremely narrow canyon, has a shorter crest length (262 feet compared to Owhyee's 840), and will take but 78,000 cubic yards of concrete, less than 15% as much as Owhyee. Sautet's mass is really puny compared with the upwards of 4,000,000 cubic yards which will go into the barrier at Boulder, sufficient, if piled in a rectangular mass on a city block, to tower higher than the Empire State Building.

IF GRAND COULEE'S eventual plans are carried through — by building a higher dam around the

BAEDEKER

For this Section

	Page
PERHAPS IT'S CLIMATE. <i>The Review, in a mood for superlatives, catalogs some western projects, and lays a bet on one</i>	51
SILVER'S NEW JOB. <i>A salubrious swimming pool is designed especially for members of the silver bloc — and others</i>	53
LAPIDARY LORE. <i>The diamond faces technological unemployment</i>	54
ELECTRONIC RUMORS. <i>Micro-waves dash high as facsimile communication is reported just around the corner</i>	55
U. S. TIES SPAIN. <i>While English yards construct some curious boats and lead the world in activity</i>	56
OTHER ITEMS: <i>Aluminum from alunite? (56) Collectanea (57)</i>	



Geo. W. Stetson

Steam-electric generation of power is constantly improving in efficiency, as The Review points out on page 65. At the left is shown the oil- and gas-fired boilers and above the turbine room of Southern California Edison's Long Beach plant

low dam now authorized — 2,225,000 horse power would be generated at this point on the Columbia as compared with 1,835,000 at Boulder, and the concreting would also be greater in volume. The low dam, on which the contractor expects to have 2,000 men at work the middle of this month, is to have a crest length of 3,400 feet compared with Boulder's 1,180. The higher dam would stretch out the 3,400 to 4,000.

Many dams longer than 4,000 feet have been built. Five existing in the United States are: Keokuk, Wilson, Conowingo, Ashokan, and American Falls, ranging from 4,360 to 4,971. Abroad there are a number over 5,000; for examples: the twice-raised Assuan (now 6,398), the Sennar on the Blue Nile in the Sudan (nearly 10,000), the Hume on the Murray River in New South Wales (5,300), the Tansa and Krishnaraja in India (both over 8,500), the Ottmachau on the Neisse in Silesia (21,326), and the Lloyds at Sukkur and Mettur (both in India and both around 5,000).

The Lloyd at Sukkur, dedicated in January, 1932, diverts water into a 6,400-mile distributing system, one of the main canals being wider than Panama and two wider than Suez. Except for the extremely long earthfill (8,890,000 cubic yards) Silesian Ottmachau, which is only 56 feet high, and the Lloyd at Mettur on the

Cauvery River (completed this fall, its masonry content totals 2,000,000 cubic yards, its height, 230 feet, and it is rated largest in the British Empire), all the above-mentioned dams are in their vertical dimensions between 100 and 200 feet.

But the top of the high 4,000-foot long dam at Grand Coulee would, if built, be 500 feet above its lowest foundation!

IN THESE columns a month ago reference was made to the swift tempo of modern bridge-building as illustrated by the San Francisco-Oakland Bridge and, even more forcefully, by its companion structure across the Golden Gate. Only a scant four years ago the 3,500-foot span of the George Washington Bridge across the Hudson was thought to be the *last word*, but the structure now being built to give a northern traffic outlet from San Francisco is to be a fifth longer.

Size, therefore, is apparently not so sure a criterion as to how a bridge will be regarded 20 years from now. Sentimental attachment for such an engineering structure is often a compelling force, as is instanced by the long-standing controversy over the demolition of Waterloo Bridge — the nine-span affair James Rennie placed astride the Thames in 1817 — and its replacement by a new six-lane structure. If, then, the Golden Gate crossing can but provoke in the mind of the man on the street in the 1950's the sort of affection rendered the Waterloo, or the Brooklyn Bridge, to cite another illustration, its fame will be secure.

EVEN a most casual acquaintance with history reinforces an opinion that the Colorado Aqueduct, like the Panama Canal, will be looked upon in time to come as one of the "wonders" of the Twentieth Century. For aqueducts, even though long disused, have the habit of lying around to excite the awe of countless semi-comprehending generations.* Traces of the Colorado

* The Roman aqueducts, for instance. In the Third Century B.C. Marcus, the praetor, built what was probably the world's first high-level aqueduct. Its length, 58.4 miles, was only a quarter of the Colorado Aqueduct. Modern masonry, as The Review observed last July, may not be nearly so permanent as the Roman.

Aqueduct's 91 miles of rock tunnels (over a third already completed) will last many centuries even though some of its 150 inverted siphons — they vary from 300 feet to 32,300, total about 27 miles, and include trial installations of 12-foot diameter, precast concrete pipes at Little Morongo — may succumb to the ravages of occasional earthquakes.

In this discussion, though, we are not primarily concerned with what the 21st, 22nd, *et seq.*, Centuries will think about these projects of the 1930's. Nevertheless, a score of years from now when this stupendous waterway is in full operation, the thought that it is undoubtedly one of man's most assuredly lasting labors of the 1930's will enhance its interest.

The beginnings of the Colorado Aqueduct coincided with the dedication last month of the \$100,000,000 Hetch Hetchy which climaxes a quarter century of struggle to care for thirsty San Francisco. With this 155-mile aqueduct it was necessary to overcome, besides natural physical problems, governmental and fiscal difficulties, to maintain construction schedules in war time, to combat radical agitators, and to untangle a multitude of water-right disputes. Such obstacles are unlikely to bother the Southern Californian project (only last month a further advance of \$15,000,000 was authorized by the RFC, making a total of \$55,000,000 so far and providing funds sufficient to carry through next June) and hence, because of its vaster scale of operation, it bids fair to build an ever-mounting series of schedule-breaking construction records.

THUS the Colorado Aqueduct successfully challenges Boulder, Grand Coulee, and the Bay Bridges, and its bid for posterity can hardly be seriously threatened by Fort Peck Dam on the upper Missouri, into which is to go 100 million cubic yards of earth; or by the plant at Bonneville on the Columbia not far from Portland with its enormous turbines; or by the 75-mile All-American Canal on which actual construction was started last August at Pilot Knob some five miles west of Yuma.

Even assuming that this Aqueduct does not maintain to its 20th anniversary the title of world's most sizable man-made waterway, there is justification to believe that

As The Review will point out next month, American aeronautical equipment is finding wide uses abroad. American planes, engines, instruments, and controllable pitch-propellers, with the aid of the 60-cent dollar, are revitalizing foreign air transport



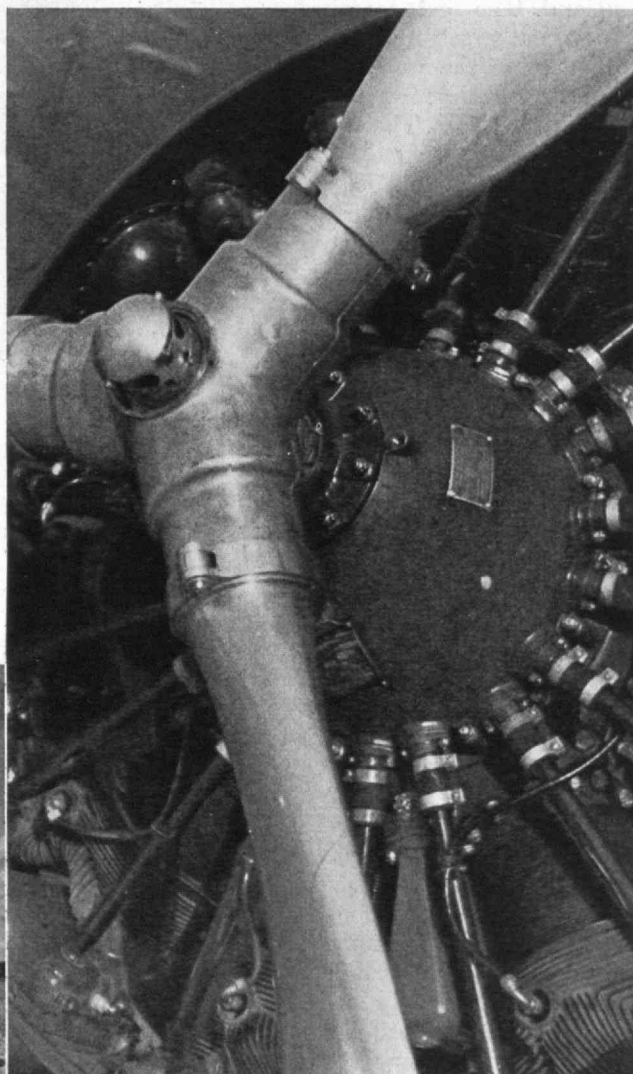
W. C. West, '11

it will be considered without question as an engineering triumph of the first order. Panama continues to be so classified although the annual traffic through the comparatively unpublicized locks at Sault Ste. Marie far exceeds the combined shipping of Panama and Suez. And one must, of course, remember that the Aqueduct will be one of the biggest things entirely located within the boundaries of the State of California.

The Cleanliness of Silver

JUST AS silver bells have a sweeter tone than those of bronze or iron, so it has long been supposed that silver utensils are more healthful and wholesome than those of iron, that wounds caused by silver implements are less likely to become infected. There is truth in these ancient beliefs: very small amounts of metallic silver dissolved in water exercise a remarkable bactericidal action while being without effect upon human beings and higher organisms.

The tendency of metallic silver to dissolve in water is exceedingly small, but none-the-less real. From ordinary surfaces, the metal dissolves very slowly. If a silver wire is placed in a freshly prepared agar or gelatine plate culture, and the culture is incubated in the usual way,



Porter

the organisms do not grow in the space next to the wire. The sterilization of water can be accomplished by leaving it in a silver flask, but the process is slow. For several years there have been obtainable in Europe water bottles, recommended especially to travelers, coated on the inside with finely-divided, spongy silver which presents a very large surface and dissolves quickly. Water left in such vessels over night is entirely free from bacteria the next morning.

For more rapid sterilization, an electromotive force is maintained between two silver plates which are immersed in the water and the silver ions go into solution quite rapidly. The voltage in practice is less than that which would decompose the water (1.6 volts). A device for use in the home has recently become available which operates on a small dry battery and will in 60 or 80 seconds produce a sufficient concentration of silver ions in a pitcherful of clear water to render the water entirely sterile after standing for an hour. Five one-hundredths of a milligram of silver dissolved in a liter of water, or one part in 20 millions, is enough.

Commercial installations for the sterilization of water by means of silver have been in use in Germany, Switzerland, and England. The first American installation was recently set up for the continuous treatment of the water in the swimming pool of the Congressional Country Club at Washington, D. C. The water is not merely made sterile but is, to some extent, rendered actually antiseptic.

Water containing four-tenths to nine-tenths of a milligram of silver ion per liter is strongly germicidal and is used for washing hose, filters, bottles, and other utensils in the brewing and dairy industries. Solutions containing not more than one-tenth of a milligram per liter are used for washing butter to improve its keeping qualities.

Adamas Challenged

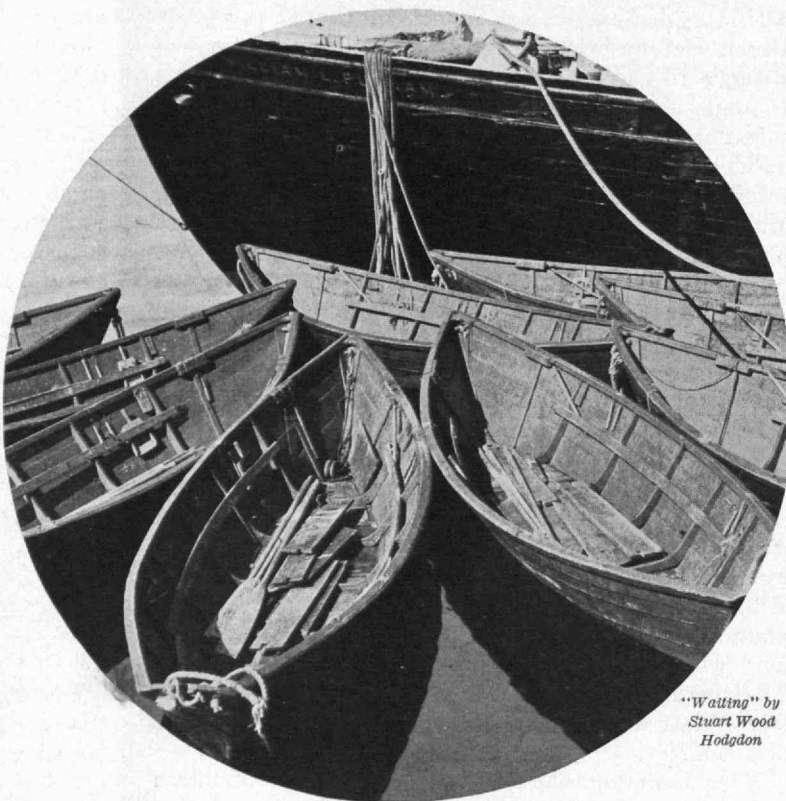
THE diamond, which Pliny described in A.D. 100 as "the most valuable of gems, known only to kings," has rivals. In the crowns of kings, the breastplates of the high priests, and as an adornment for lovely women, the diamond is still the most desired of all jewels. In its numerous industrial uses, however, the hardest of gems, whose fire has burned undimmed in war and peace through the ages, is no longer entirely supreme.

The extreme hardness of the diamond, not its romantic adamantine lustre, suggested its usefulness in other fields than that of adornment. Because nothing harder was available, the diamond has long been used in cutting, polishing, and engraving itself. As early as 1476 the lapidary, L. von Berquen of Bruges, spread powdered bortz upon his wheel to facet diamonds. It is commonly used for the same purpose in the finishing of many other gems.

The diamond is also valuable in drilling and cutting glass, porcelain, and other hard substances, and it is not unknown in dentistry for drilling. The engraver of

metals often uses it in his most delicate tasks, and its hardness makes it valuable for certain turning operations, particularly in forming electric light carbons and in shaping hard rubber and plastic materials. In the field of mining the diamond is employed in the bits of the diamond drills used in exploring the earth to great depths. On the teeth of saws it cuts stone. It is one of the valuable tools of the die maker, and is widely employed in wire drawing to extreme fineness.

Nothing so beautiful and so useful as the diamond could hope to escape the challenge of science. Its artificial development has long been the goal of innumerable workers who sought by various means to match its brilliancy and hardness. Recently the Norton Company,



*"Waiting" by
Stuart Wood
Hodgdon*

long versed in the making of abrasives, announced the development of boron carbide, which is said to be the hardest substance ever produced by man. A chemical product of ordinary coke and boric acid, which are subjected to extremely high temperatures in electric furnaces, the new substance closely approaches the hardness of the diamond and is said to be useful for many purposes for which the gem is now employed. On Moh's modified scale of hardness, silicon carbide ranks as 13, boron carbide as 14, and the diamond, 15.

The new material is already being used in the place of diamond dust in many industrial operations. An outstanding advantage is that it may be formed for various tasks. It is proving valuable, for illustration, in the nozzles of sand-blasting machines in which the rush of abrasive under high pressure quickly wears out nozzles of other materials. A boron carbide nozzle is said to last the life of the machine, while older forms were often destroyed in 30 minutes.

Raymond R. Ridgway of the research laboratories of the Norton Company explains that the process of making boron carbide is comparatively simple. The first step involves the removal of the water of crystallization which accompanies the boric acid crystals. The removal of this water changes the physical character of the smooth crystals into that of a glass slightly harder than ordinary window glass. This anhydrous oxide must be carefully protected to prevent it reabsorbing water and returning to its normal form of boric acid. Carefully weighed quantities of the anhydrous glass are proportioned with the highest grade petroleum coke, since the inclusion of any ash impurities will destroy the quality and value of the resultant abrasive. In a furnace which



"Streamlines"
by William R.
Power, '31

reaches a temperature approximately 5,000° F. the oxygen is taken away from the glass and carbon substituted. At the very high temperature obtainable only in the electric furnace, the carbide melts and from this melt crystallizes beautiful crystals of boron carbide, which may serve as an abrasive just as they are taken from the furnace.

In Austria one Hans Karabacek has been granted a patent for synthetic diamonds which are said to closely resemble the celebrated South African gems. The crystals produced so far weigh less than half a carat, but they are ten times larger than those produced by Henri Moissan, the French chemist, who, as well as Acheson, discovered carborundum, and produced diamonds artificially by permitting dissolved carbon to crystallize out at high temperature and pressure from molten iron. Up to the present, however, the artificial production of diamonds has not passed the laboratory stage.

The Eye and the Air

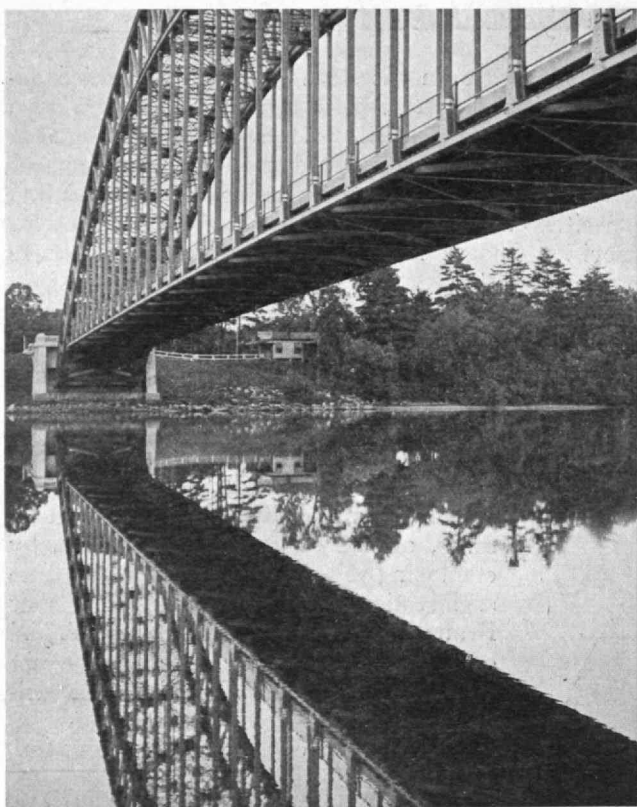
IN AN article on the status of television which appeared in *The Review* for October, 1932, J. Warren Horton, '14, a member of the staff of the Department of Electrical Engineering, stated that "it would appear from an inspection of the relative message-carrying capacities of various channels that the logical vehicle for television images is to be found in the short-wave transmission."

Mr. Horton's conclusion is of particular interest in the light of present trends in the development of facsimile transmission on ultra-short waves. The Radio Corporation of America is carrying on elaborate experiments on wavelengths below five meters, a zone singularly free of static. The disadvantage of micro-waves, which disappear at the horizon, or a distance of about 40 miles, can be overcome, it is stated, by employing relay or booster stations. One such station is now being installed at New Brunswick, N. J., another is projected, and officials of the Radio Corporation predict that within a year New York and Philadelphia will be linked by a micro-wave facsimile system capable of transmitting messages at high speed.

David Sarnoff, President of R. C. A., in an interview with the *New York Times* is quoted as saying that "no longer must the message be broken down into hundreds of dots and dashes. It is produced by light 'brushes' that 'paint' it line for line. The next step is to flash the complete picture. That is a great step forward. The first logical step, of course, is to transmit still pictures and print. That is facsimile radio. The next step will be to send the moving pictures. That is television."

Meantime, the Associated Press is installing Western Electric facsimile apparatus on a nation-wide scale, with sending and receiving units to be located in 26 key cities. This system makes possible the transmission of a picture up to 12 by 17 inches in less than half an hour. At the same time the Hearst organization of 32 newspapers is extending the usefulness of the Walter Howey photo-electric system of half-tone engraving (*The Review*, April, 1933, page 242) by adapting it for wire transmission of both photographs and engravings.

The air was never so full of electronic rumors and reports. Facsimile message systems seem to be gaining, and whatever the present status of television, experimental work is going forward at a feverish pace in scores of laboratories. There is much talk of facsimile devices, home units for recording "tabloid radio newspapers" in the cold dark hours of the night when the communication channels of the air are less congested, and of new prospects for transmission in the short-wave region of which so much has been learned in recent years. What will come of all this time will prove. Television is still just around the corner.



Orne

Above: Highway bridge across the Merrimack River at Tyngsboro, Mass. Right: Covered bridge across the St. John at Hartland, New Brunswick

Marine Activity

HOTTEST spot of British maritime activity has long been in a Clydebank yard where the super-liner *Queen Mary*, whose ceremonious launch was noted in *The Review* last month, is now having her 11 decks paved, and her 200,000 horse power single-reduction geared turbines, her 163-ton rudder, weatherproofing for her 60,000 cubic feet of refrigerated space, and glass or other covering for her 2,000 portholes, installed.

But British shipwrights have also been industriously engaged on a program punctuated by a variety of merchant craft: reconstructing a liner like the *City of Dieppe*; starting a 25,000-ton passenger vessel for the Union Castle Line, temporarily known as No. 942; trial-running a twin-screw tug, the *Nevern*, destined to be pride of an African harbor in Sierra Leone; converting a former lighthouse vessel, the *Orphir*, to film and conduct salvage operations on the *Lusitania*, 46 fathoms down off Old Head of Kinsale; getting three car-ferry boats ready for an unusual dock building at Dover to cope with an unusual tidal range of 23 feet.

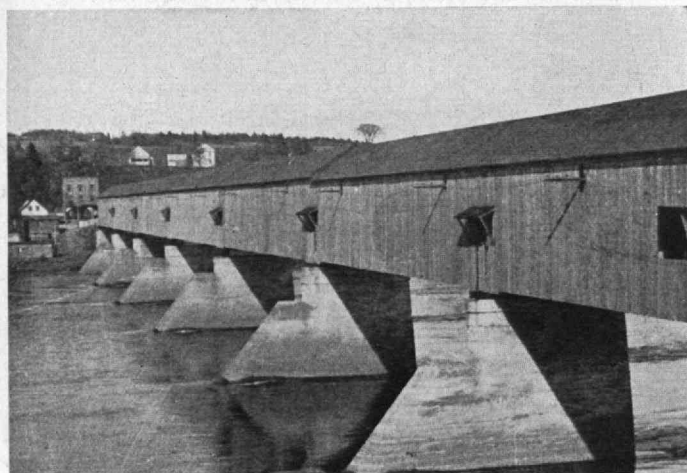
Activity such as this insures that Lloyd's *Register of Shipping*, the shippers' bible, which passed its hundredth birthday on October 21, will report when it is assembled for next year by its engineers and surveyors stationed world-wide in 156 cities, that a third of the world's merchant fleet is still Empire owned.

In the 20 years since the outbreak of the War, world tonnage has increased from 45,000,000 to around 65,000,000, though for 1933-34 production of new ships (192 ships grossing 350,430 tons, down 25% from

1932-33) dropped to a record low. Second to Britain stands the United States with 10,000,000, excluding the two-and-a-half-million on the Great Lakes. Japan, soon to have a half-dozen sizable new freighters in the U. S.-Orient service, and Norway are now credited with 4,000,000 tons apiece; Germany, which launches the new Hapag Lloyd liner *Scharnhorst* next month, is in fifth position with 3,700,000 tons; France, whose *Normandie* puts to sea next spring, is sixth with 3,300,000; and Italy is seventh with 2,900,000 tons. According to Lloyd's, but 27,000 tons of shipping is now building in the United States, which puts us in a practical tie with Spain for ninth position.

Alunite to the Fore

IN 1911 a gold prospector, Tom Gillen by name, while plying his trade in the Tushar Mountains of Southwestern Utah, stumbled upon a freakish pink spar. What Tom Gillen found may be of more value than any gold he might have discovered, for it has proved to be one of the largest bodies of pure alunite in the world. This mineral, containing alumina, potash, and sulphuric



acid, forms a basis for the manufacture of aluminum, potash fertilizer, and sodium nitrate.

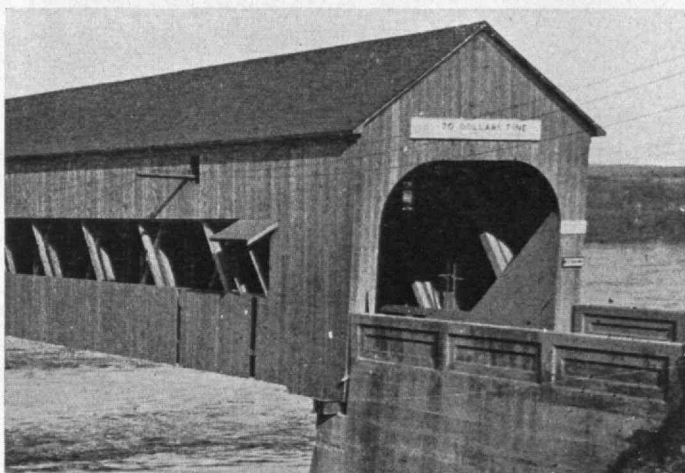
To date aluminum, while one of the most abundant minerals available to man, has been produced profitably from only one ore, bauxite. What lends interest, however, to Utah's vast deposit of alunite is the recent announcement of the Bohn Aluminum and Brass Corporation of Detroit that it had discovered a commercially feasible procedure for deriving aluminum from alunite. Already the company has started to build a test plant in Detroit and it has projected a big producing plant in Utah.

Local Utah interests have not overlooked the possibilities of the pile of alunite near Marysvale. Spurred on by the future possibility of obtaining electric power from Grand Coulee or Boulder (see page 51), the public and private organizations of Utah have combined to offer 1,000 tons of the ore to the Government for experimental treatment at Muscle Shoals.

Reported Paul J. Fox, for several years technologist in the United States Department of Agriculture, after a three months' study of the alunite deposits: "Alumina

stands to aluminum in the same relation as iron ore stands to pig iron. The great difference in the two cases is that while iron can be produced by smelting iron ore with coke and limestone in a blast furnace, the reduction of alumina to make aluminum requires electric power in quantity. The new and present importance of alunite as a source of alumina, in view of the huge power development at Boulder Dam and elsewhere in the West near the Alunite, is too obvious to need more than mention."

Meanwhile, Russia is striving to become the world's largest producer of aluminum. Four plants already in operation are expected to produce 105,000 tons a year by 1937, while five projects involving metallic aluminum plants are planned for completion between 1934 and 1936 with an estimated production of 105,000 tons. Even though these particular quotas may not be attained, it is probable that by 1937 Russia will be the world's largest producer of aluminum. The Soviets have both bauxite and alunite; in Saglik, 100,000,000 tons of alunite is believed capable of yielding about 15,000,000 tons of aluminum. Exploitation of this supply is scheduled for 1935.



C. A. Dyer

Collectanea

FOR years glass technologists have been concerned primarily with increasing the transmissivity of glass to sun's rays. Now they are turning their attention to the development of glass for excluding certain portions of the solar spectrum. Achievement No. 1 in this direction has been the creation of a glass which removes 52% of the heat in sunlight while permitting the passage of sufficient light for illumination purposes. Designed to relieve the torrid conditions in buildings during hot weather, the new heat-absorbing glass contains iron.

¶ Production of more powerful x-rays looms as a result of investigations carried out by the Westinghouse Lamp Company. By using uranium and thorium as targets in x-ray tubes to replace tungsten, more deeply penetrating x-rays may be produced without building more expensive and high-voltage equipment.

¶ To the unwieldy number of professional engineering societies already in existence has recently been added another, the National Society of Professional Engineers. The purpose of this new group is to assist members eco-

nomically and to bring about legislation to protect them. Coöperating with the new society are the American Association of Engineers, the National Council of State Boards of Engineering Examiners, and the State Societies of Professional Engineers of New York, New Jersey, Pennsylvania, and Connecticut.

¶ With nationalism rampant, internationalists may gain some crumbs of comfort from the fact that the locust is still treated as an international problem. Early this fall, the Third International Locust Conference met in London and considered the sixth report of the Committee on Locust Control of the Economic Advisory Council. Noted this report: "The truly international character of the locust problem has never been demonstrated on so large a scale or in so convincing a manner as during the outbreak which began nine years ago and is still in progress. Thus in the astonishingly short period of five generations, the tropical migratory locust was able to cross Africa from west to east. In the course of the next three generations it spread over the whole of East Africa, and crossed the continent diagonally from northeast to southwest. The chief lesson of the last few years has been the realization that . . . it is impossible to control a locust outbreak once it has been allowed to spread . . ."

"If the permanent breeding places were known and were kept under regular observation, it should require but little expenditure of time or money to control swarms immediately they began to form after the transformation of the locusts from the solitary to the swarming phase. Control of this type, once established, would at last rid Africa of the constantly recurring risk of devastation by locusts."

Left: San Francisco bridges may break records, but New Brunswick folk call this the longest covered bridge in the world. Calvin Coolidge would have cherished this picture. Below: Relief photograph of New York's skyline



Browning

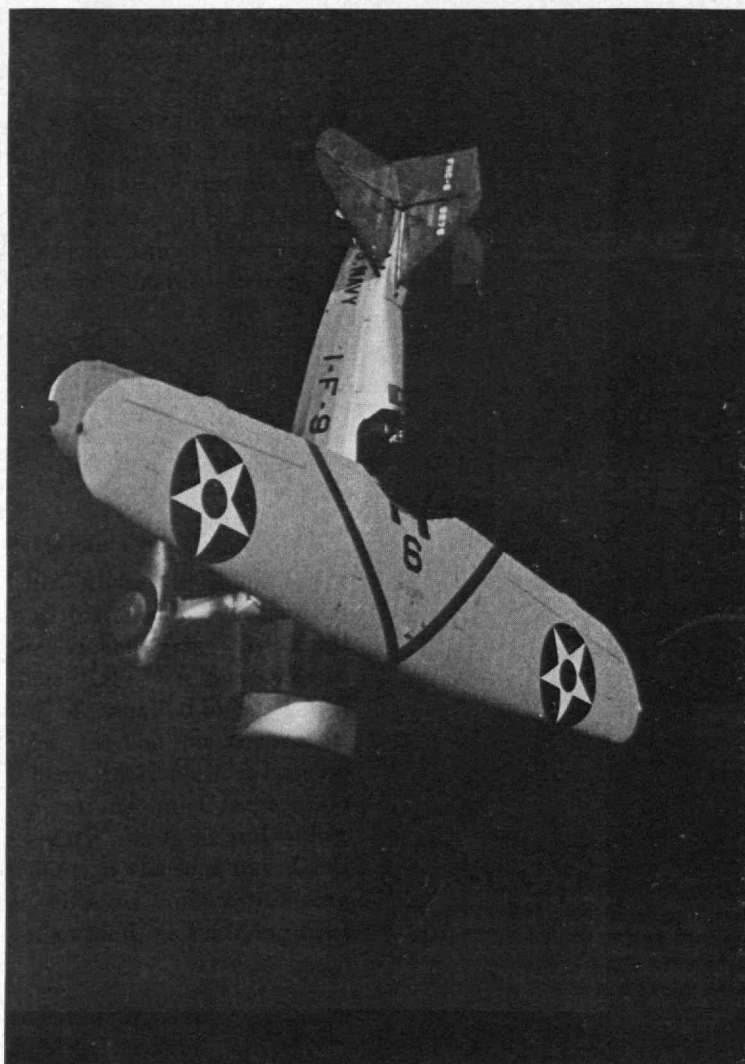


OVER THE HUMP
*Clearing San Ysidro of the Sierra Nevada at
 better than 12,000 feet*

THE TECHNOLOGY REVIEW

Beware the *Fleet Flying*

ILLUSTRATIONS BY



WIND SOUNDINGS
*Aboard an aircraft carrier careful weather
 observations are made for the information of the
 flyers. Winds aloft are determined by means of
 hydrogen-filled balloons which, when released,
 are observed through a theodolite in their ascent*



BOILING DOWN

*If you wish to know the meaning of tension, just dive one of these
 Curtis Goshawks at its terminal velocity. It's top speed is better than
 200 miles an hour and its terminal dive velocity in excess of 350
 miles an hour*

NOVEMBER, 1934

Propeller!

With a Camera

ALBERT W. DUNNING



HOMING

Dusk and the last man comes aboard (in this instance John Jewett, '32)

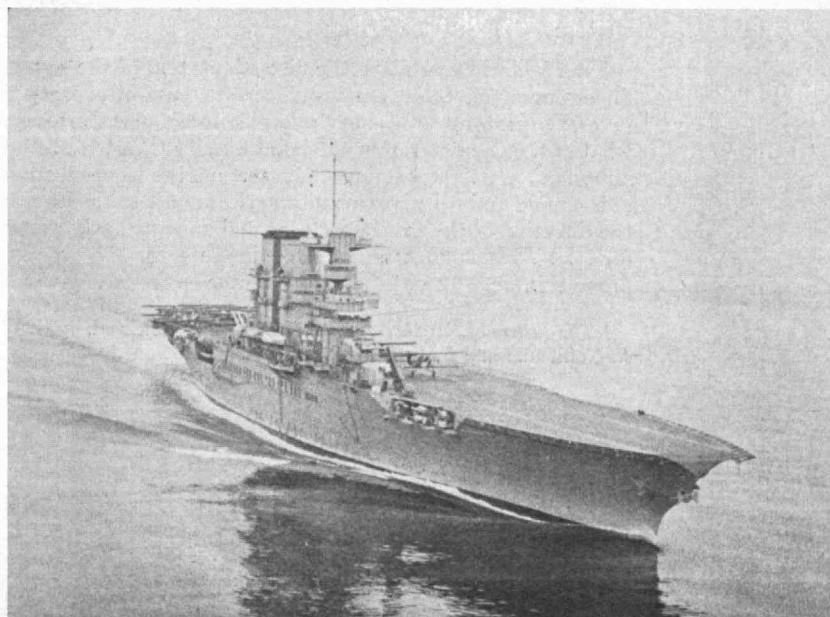


PORTHOLE SILHOUETTE

It's sunrise and you are looking at the U.S.S. Lexington through the porthole of a destroyer. She is anchored off Coronado Roads waiting to take part in fleet maneuvers. The mountains of Mexico loom dimly in the background

U. S. S. Saratoga

Flight quarters on this ship is no idle time. With whirling propellers but a few inches from the tails of planes ahead, the deck is no place for a novice. Safety precautions are strictly adhered to and all hands take heed of the warning, "Beware the Propeller!"



Faraday Investigates Table-Turning

*A Curious Footnote to the Life of the
Discoverer of Electro-Magnetic
Induction*

BY KATHARINE MAYNARD

A RECENT survey of a little-used section of Technology's Vail Library has brought to light two small pamphlets, once the property of Michael Faraday and bearing marks of his careful perusal. Adding further to their interest is a letter from the author folded within the second pamphlet, on which there is a characteristic annotation of half a dozen lines in Faraday's own hand. The topic under discussion is the then popular subject of table-turning, concerning which he had written to his friend Schoenbein on July 25, 1853: ¹

... I have not been at work except in turning the tables upon table turners — nor should I have done that but that so many enquiries poured in upon me that I thought it better to stop the inpouring flood by letting all know at once what my views and thoughts were. What a weak, credulous, incredulous, unbelieving, superstitious, bold, frightened, what a ridiculous world ours is, as far as concerns the mind of man. How full of inconsistencies, contradictions and absurdities it is. I declare that taking the average of many minds that have recently come before me (and apart from that spirit which God has placed in each) and accepting for a moment that average as a standard, I should far prefer the obedience, affections and instinct of a dog before it. . . .

The two pamphlets have the same title, viz.: *A Few Sober Words of Table-talk about Table-spirits, and the Rev. N. S. Godfrey's Incantations*, by Dr. John Prichard, Fellow of the Royal College of Surgeons. They were printed at Leamington in 1853 after Faraday's views on the subject were publicly known, and in the first edition the author quotes Faraday in support of his vehement denunciation of the theories advanced to explain the alleged phenomena. Not Mesmerism, not Electricity, not Satanic possession may be accepted as a cause, but, proceeding by the acknowledged laws of matter, he writes:

I am inclined to believe the nice adaptation of the several fingers upon the table, amounting, in the case of a party of several operators, to no inconsiderable force, partakes somewhat of the character of what chemists call "the attraction of adhesion" . . . (presuming that the intense concentration of the mind and will gives an automatic impulse to the force in the direction of the movement expected and anxiously waited for). . . . Much that is admitted in Table-turning goes to prove this fact — sceptics have no power — the strong will of

¹ *The Letters of Faraday and Schoenbein, 1836-1892*; ed. by G. W. A. Kahlbaum and F. V. Darbishire. London, 1899

one of the operators that the turning shall be contrariwise to the will of the rest, impedes or stops the motion, — tables, hats, chairs, and plates, all having tolerable facilities in their construction for such evolutions, are the articles dignified by these astounding gifts. Perhaps, however, when this genus has been perfected in its modern accomplishments, side-boards and beds, fenders and fire-screens, may acquire the same extraordinary talent.

In spite of the vigor of his doubts at this time, however, the Doctor's views changed, and, upon the basis of fifteen experiments listed in the second edition (each with a marginal check by Faraday), he confidently asserts that "a new and hitherto unrecognized law, namely, the disturbance of the atoms of matter by the instantaneous transmission of a fluid so powerful and so subtle as that of electricity into its spaces or pores, exerting an antagonistic force to that of gravity, will be found to be the *vis movendi*."

The later chagrin with which he recants this bold announcement is revealed in the following letter to Faraday, which has so fortunately been preserved these eighty years within the leaves of his second paper:

[Written to me. M. F.]

12 Nov^r 1853

Sir, — I owe it to your kindness to apologize for the trouble I have given you in a most worthless subject. I am bound in honour not to explain how I have been deceived, but perhaps this makes my vexation greater. The muscular action (charitably called involuntary) of excited manipulators is the whole and sole *fons et origo*, and I may add *mali*.

I am, Sir,

Your obliged and obed't

J. Prichard

With the calmness of the true philosopher (note especially the simple, "I did the latter"), Faraday records the steps leading to this avowal in the manuscript annotation here quoted:

Mr. Prichard sent me a copy of the first edition of his *Sober Words*. After that (& quickly) he sent me a letter containing the facts (so-called) from p. 15 and onwards, requesting me, if I approved, to send the letter to the *Times*, or if not, return it to him: — I did the latter. About the 5th or 6th of Nov^r he sent me the Second Edition of his *Sober Words* with the additions of pp. 15-20; and on the 12th of the same month, this note announcing his discovery of the deceit practiced towards him.

M. F.

Why Professor Faraday thought it worth while to preserve these obscure papers we can only conjecture. Yet in the letter to Schoenbein already quoted he shows his concern over the popular credulity, and in a letter to the *Times* ² he goes so far as to say:

I have been greatly startled by the revelation which this purely physical subject has made of the condition of the public mind. No doubt, there are many persons who have formed a right judgment or used a cautious reserve . . . but their number is almost as nothing to the great body who have believed and borne testimony, as I think, in the cause of error. . . . By the great body, I mean such as reject all consideration of the equality of cause and effect. . . . I think the system of education that could leave the mental condition of the public body in the state in which this subject has found it must have been greatly deficient in some very important principle.

(Continued on page 72)

² June 30, 1853.

Mathematics and Bridge

Probability and Its Practical Limitations

BY L. F. WOODRUFF

MATHEMATICS is a contributory cause to almost as many errors as it assists in eliminating — not through any inherent fault of its own, but through its misuse. This is as true in bridge and card games in general as in other fields. Mathematical analyses are nearly always based on assumptions which idealize the problem. A careful and correct mathematical solution, based on these assumptions, often seems to have an almost hypnotic influence on the ordinary user, who tends to place much more reliance on the solution than he would on the basic assumptions themselves, if separated from the intervening mathematics.

Probability may be defined as a mathematical study of the unknown. To quote a well-known writer on the subject, Dr. T. C. Fry, "Unless a certain amount of ignorance exists, questions of probability are trivial." Obviously, as a hand of Contract progresses, the amount of ignorance regarding the hidden hands continually decreases, and the probabilities of various possible distributions change with each new bit of evidence which is exposed. It is usually left to a sixth "card-sense" to evaluate the complex or conditional probabilities in bridge playing, but it is incontestable that the further we can carry sound mathematical analyses, and the less we leave to judgment or card-sense, the more likely we are to be right.

As a first illustration of the effect of successive increments of knowledge on probability, consider the distribution of suit lengths. It is well known that there are 39 possible distributions, and they are listed in descending order of probability in Table I. In the computation of the probabilities in this table, the basic assumption has been made that all possible combinations of the cards are equally likely. The column marked "Probability" indicates the fraction of the time that the corresponding distribution would be likely to occur. For example, the most probable distribution, 4-4-3-2, should occur approximately 21.55% of the time. The last column, headed "Cumulative Probability," indicates the fraction of the time that either the corresponding distribution or one of those above it in the table will occur. For example, one of the first five distributions will occur 71.11% of the time.

We may combine these 39 probabilities in various ways to determine other probabilities. For example, in Tables II and III are presented the probabilities of

holding hands with longest and shortest suits of various lengths. Obviously, the shortest possible long suit is four, and the longest possible short suit is three.

We see from Table II that we should have a length of five or better in 64.92% or nearly two-thirds of our hands. From Table III we see that more than half the time our shortest suit should consist of two cards.

We may combine the entries of Table I also to classify hands as one-suiters, two-suiters and three-suiters. We define a one-suiter as a hand having only one suit of four or more cards; a two-suiter has just two suits of four or more cards, and a three-suiter has three suits of four or more. The combinations and probabilities are presented in Table IV.

It is probably surprising to most players to learn that two-suiters are about 50% more common than one-suiters, as indicated in Table IV.

But of what use is all this? (Except to the author, who has had to study it in connection with the design of schedules for the irregular cams for the shuffling machine developed by Mr. E. L. Rose and himself.) We may have an 8-3-2-0 distribution, and know that it is so rare that it occurs only about once in a thousand times, but that does not help us in bid or play. We may however carry our computations further, and obtain some use from them. Before the bidding, we know that the 39 remaining cards must be divided 5-10-11-13 in the respective suits, if our own hand is divided 8-3-2-0. The probabilities of the distributions in the remaining three hands are no longer those given in Table I, because our degree of ignorance has been somewhat decreased. Certain of the 39 distributions are now impossible, and conversely others are rendered much more likely. Consider for example the suit in which we hold the void. The probabilities of the various possible holdings of this suit in each of the other hands will be those presented in Table V. It is seen that there is a very good chance that adversaries may have a six-card suit or better, and the desirability of making a preemptive bid may be gauged better.

Suppose further that one adversary makes an opening bid of one in our void suit. This gives us the additional information that he has at least four of the suit, and when we correct our probabilities in accordance with the new evidence, there is almost an even chance that he has at least six.

It is usually left to a sixth "card-sense" to evaluate the complex or conditional probabilities in bridge playing, but it is incontestable that the further we can carry sound mathematical analyses, and the less we leave to judgment or card-sense, the more likely we are to be right

TABLE I

PROBABILITIES OF THE 39 POSSIBLE SUIT DISTRIBUTIONS

No.	Distribution	Possible Combinations	Probability	Cumulative Probability
1	4-4-3-2	136,852,887,600	0.215,512	0.215,512
2	5-3-3-2	98,534,079,072	0.155,168	0.370,680
3	5-4-3-1	82,111,732,560	0.129,307	0.499,987
4	5-4-2-2	67,182,326,640	0.105,797	0.605,784
5	4-3-3-3	66,905,856,160	0.105,361	0.711,145
6	6-3-2-2	35,830,574,208	0.056,424,9	0.767,570
7	6-4-2-1	29,858,811,840	0.047,020,7	0.814,591
8	6-3-3-1	21,896,462,016	0.034,481,9	0.849,073
9	5-5-2-1	20,154,697,992	0.031,739,0	0.880,812
10	4-4-4-1	19,007,345,500	0.029,932,2	0.910,744
11	7-3-2-1	11,943,524,736	0.018,808,3	0.929,552
12	6-4-3-0	8,421,716,160	0.013,262,3	0.942,815
13	5-4-4-0	7,895,358,900	0.012,433,4	0.955,248
14	5-5-3-0	5,684,658,408	0.008,952,03	0.964,200
15	6-5-1-1	4,478,821,776	0.007,053,11	0.971,253
16	6-5-2-0	4,134,297,024	0.006,510,56	0.977,764
17	7-2-2-2	3,257,324,928	0.005,129,54	0.982,893
18	7-4-1-1	2,488,234,320	0.003,918,40	0.986,812
19	7-4-2-0	2,296,831,680	0.003,616,98	0.990,429
20	7-3-3-0	1,684,343,232	0.002,562,45	0.993,081
21	8-2-2-1	1,221,496,848	0.001,923,58	0.995,005
22	8-3-1-1	746,470,296	0.001,175,52	0.996,180
23	7-5-1-0	689,049,504	0.001,085,09	0.997,265
24	8-3-2-0	689,049,504	0.001,085,09	0.998,350
25	6-6-1-0	459,366,336	0.000,723,396	0.999,074
26	8-4-1-0	287,103,960	0.000,452,123	0.999,526
27	9-2-1-1	113,101,560	0.000,178,109	0.999,704
28	9-3-1-0	63,800,880	0.000,100,472	0.999,804
29	9-2-2-0	52,200,720	0.000,082,204,1	0.999,887
30	7-6-0-0	35,335,872	0.000,055,645,9	0.999,942
31	8-5-0-0	19,876,428	0.000,031,300,8	0.999,974
32	10-2-1-0	6,960,096	0.000,010,960,5	0.999,984
33	9-4-0-0	6,134,700	0.000,009,660,74	0.999,994
34	10-1-1-1	2,513,368	0.000,003,957,98	0.999,998
35	10-3-0-0	981,552	0.000,001,545,72	1.000,000—
36	11-1-1-0	158,184	0.000,000,249,103	1.000,000—
37	11-2-0-0	73,008	0.000,000,114,971	1.000,000—
38	12-1-0-0	2,028	0.000,000,003,193,63	1.000,000—
39	13-0-0-0	4	0.000,000,000,006,299,08	1.000,000
Totals		635,013,559,600	1.000,000	

When the dummy is laid down and 26 cards are in view of each player, he has additional evidence to assist him in deciding on the most probable division of the remainder. The bidding of course will have told a great deal, but in conjunction with this a knowledge of the probabilities of random division is of value. As an illustration of this, consider the following example, which

was worked out by the author for the use of Mr. Ely Culbertson in the preparation of his new Red Book on Play. Declarer (S) holds A K J 10 2 of trumps, and dummy (N) holds 7 6 4 3. Ace is led and adversaries follow suit with two small cards. Later, dummy (N) leads a small card and E follows suit with the last outstanding small card. Should declarer play the Knave or the King? SOLUTION. At the start of the hand the four outstanding cards will be divided in one of the following five ways, with respective probabilities as indicated:

W E

$$4 \quad 0 \quad \frac{(13 \times 12 \times 11 \times 10)}{(26 \times 25 \times 24 \times 23)} \quad 1 = 110 \div 2300$$

$$3 \quad 1 \quad \frac{(13 \times 12 \times 11 \times 13)}{(26 \times 25 \times 24 \times 23)} \quad 4 = 572 \div 2300$$

$$2 \quad 2 \quad \frac{(13 \times 12 \times 13 \times 12)}{(26 \times 25 \times 24 \times 23)} \quad 6 = 936 \div 2300$$

$$1 \quad 3 \quad \text{Same as 3-1} \quad 572 \div 2300$$

$$0 \quad 4 \quad \text{Same as 4-0} \quad 110 \div 2300$$

$$\text{Total} \quad 2300 \div 2300 = 1.$$

Since both adversaries followed suit on the first round, the possibility of 4-0 or 0-4 having been the division is eliminated. There remain:

W E

$$3 \quad 1 \quad 572 \text{ parts}$$

$$2 \quad 2 \quad 936 \text{ parts}$$

$$1 \quad 3 \quad 572 \text{ parts.}$$

Had the original division been 3-1 or 1-3 there would have been 1 chance in 4 that the singleton was the queen, and so would have fallen on the first round. This did not happen, so we must reduce the remaining chances of 3-1 and 1-3 division by 25%. This leaves:

W E

$$3 \quad 1 \quad \frac{3}{4} \text{ of } 572 = 429$$

$$2 \quad 2 \quad 936$$

$$1 \quad 3 \quad 429.$$

The trumps now remaining in adversaries' hands are divided in one of the following three ways, with respective chances as shown:

W E

$$2 \quad 0 \quad 429 \text{ parts}$$

$$1 \quad 1 \quad 936 \text{ parts}$$

$$0 \quad 2 \quad 429 \text{ parts.}$$

Now E plays a small trump. This eliminates the possibility of W having 2 and E having none. If it were a 1-1 division, there would be an equal chance of the Queen dropping from E, and since this did not happen, the

chances of 1-1 having been the division must be reduced by one-half. Just before the decision must be made as to whether or not to finesse, the chances stand:

W	E	
1	1	$\frac{1}{2}$ of 936 = 468 parts
0	2	429 parts
		897.

The probability is 468/897 or 12/23 that the Queen is held by West, and so the finesse has slightly *less* than an even chance, or 11/23, of succeeding. Unless there are other considerations which would outweigh, the King should be played.

We may go back and determine what percentage of the time this method of play can be expected to capture all of adversaries' trumps. Out of a total of 2300 original chances, there are 110 that all four outstanding trumps are held by E, and if this is the case it will be disclosed by the Ace lead and the failure of W to follow suit. The finesse may then be taken without risk. There are 2×572 or 1144 chances of a 3-1 division, and in one quarter of these, or 286, the Queen would be expected to be the singleton and to drop the first round. Lastly, there are 936 chances of 2-2 division, and in half these cases, or 468, the Queen should be in E, and fall on the second-round lead from dummy, enabling declarer to cover with his King with safety. If this does not happen, declarer should still play the King, and has 468 more chances that Queen will fall from W. He therefore has a total of $110 + 286 + 468 + 468 = 1332$ out of 2300 chances, or 57.9%, of capturing all the trumps. If the declarer could know ethically the whereabouts of the Queen, he would be able to capture all the trumps in every case except where W held the Queen and either two or three small, which should occur in only $110 + \frac{3}{4}$ of 572 or 539 times out of 2300, or 23.4%. The penalty of ignorance of the whereabouts of the Queen reduces the declarer's chance from 76.6% to 57.9%, even with the soundest play. If he should finesse instead of play for the fall, his chances would be reduced still further, to 1293 out of 2300, or 56.2%. On the chances of those poor mortals who would finesse on the first round, let us charitably draw the curtain.

It is interesting to consider that in the development of the highly competitive art of contract bridge, the most notable pioneer in the methods of bidding and play, Mr. Ely Culbertson, has combined with a thorough knowledge and appreciation of mathematical probability a practical sense of its limitations.

It is almost inconceivable to the average player the number of combinations which some of the leading experts carry in their minds in match play. Not only are the usual probabilities considered, but at least one player of the writer's acquaintance actually makes use of combinations that existed in the deck before the shuffle in deciding the play of his hand, on the theory that the ordinary imperfect shuffle fails to break up completely the groupings from the preceding hand.

TABLE II

PROBABILITIES OF LONGEST SUIT LENGTHS

Longest Suit	Possible Combinations	Probability
4	222,766,089,260	0.350,805
5	281,562,853,572	0.443,397
6	105,080,049,360	0.165,477
7	22,394,644,272	0.035,266,4
8	2,963,997,036	0.004,667,61
9	235,237,860	0.000,370,445
10	10,455,016	0.000,016,464,2
11	231,192	0.000,000,364,074
12	2,028	0.000,000,003,193,63
13	4	0.000,000,000,006,299,08
Totals	635,013,559,600	1.000,000

TABLE III

PROBABILITIES OF SHORTEST SUIT LENGTHS

Shortest Suit	Possible Combinations	Probability
3	66,905,856,160	0.105,361
2	341,657,192,448	0.538,031
1	194,023,212,812	0.305,542
0	32,427,298,180	0.051,065,5
Totals	635,013,559,600	1.000,000

TABLE IV

PROBABILITIES OF ONE, TWO AND THREE SUITERS

	Possible Combinations	Probability
One Suiters	242,948,972,400	0.382,589
Two Suiters	365,161,882,800	0.575,046
Three Suiters	26,902,704,400	0.042,365,6
Totals	635,013,559,600	1.000,000

TABLE V

PROBABILITIES OF HOLDINGS BY OTHER THREE HANDS IN A SUIT IN WHICH A PLAYER HAS A VOID

Length of Suit	Possible Combinations	Probability
0	10,400,600	0.001,280,48
1	125,550,100	0.015,457,2
2	602,640,480	0.074,194,6
3	1,519,156,210	0.187,032
4	2,234,053,250	0.275,048
5	2,010,647,925	0.247,543
6	1,128,784,800	0.138,971
7	395,074,680	0.048,640,0
8	84,658,860	0.010,422,9
9	10,689,250	0.001,316,02
10	743,600	0.000,091,549,0
11	25,350	0.000,003,120,99
12	338	0.000,000,041,613,2
13	1	0.000,000,000,123,116
Totals	8,122,425,444	1.000,000

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

November Docket

HOW have Technology finances weathered the depression? The Review Gazetteers present an answer (page 67), after reporting below on the successful inauguration of the new five-year course and on three notable contributions to engineering from Institute laboratories (pages 64, 65).

Also gazetted for November: *Local Census of Research Fellows* (66); *A Larger Graduate House* (75); *How Technology Graduates Have Fared in Getting Jobs* (75); *Architectural School Notes* (76); *Registration This Year* (76).

Training Men for Public Service

IN HIS annual report to the Corporation early last month, President Compton announced that Technology's new five-year course, designed to educate scientists and engineers for greater public service, started auspiciously this fall with an adequate number of students of high standing.

Calling this new course the most important change in the Institute's curriculum in recent years, President Compton pointed out that its purpose is to give the student a better introduction to fundamental economic and social aspects of the environment in which he is to carry on his profession. Its curriculum is planned to include the same professional study as is available in the four-year courses, but in addition, a year of social sciences, all of these subjects being advantageously distributed throughout the five years and culminating in a thesis which preferably would deal with some economic aspect of the field of professional study.

The social science courses offer opportunities for selection among such subjects as economic theory, industrial relations, business management, labor organization, government control of industry, investment analysis and finance, public utilities, statistical methods, international law, American foreign policy, and sociology.

The Institute's objective, noted Dr. Compton in his report, "is to make an effective contribution to our national welfare in the particular field of technology. We do this by giving professional training to our students, by instilling in them high ideals of professional conduct and citizenship, by contributing to the advancement of knowledge and the art of its useful applications through research, and by direct public services to government and society in the fields of our particular competency. Our ideal is to perform these services in the best possible way; to maintain leadership in the realm of research; and to render other public service in a distinctive manner."

The new five-year course, the first of its kind in American higher education, drives directly at this ob-

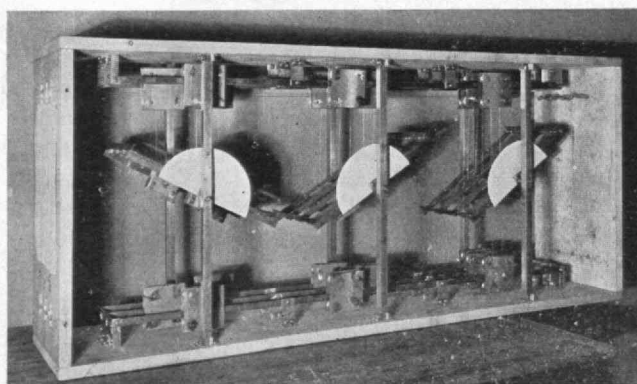
jective. Its possibilities are already indicated in the great demand on the part of governmental and public bodies for the services of members of the Institute Staff.

New Mathematical Servant

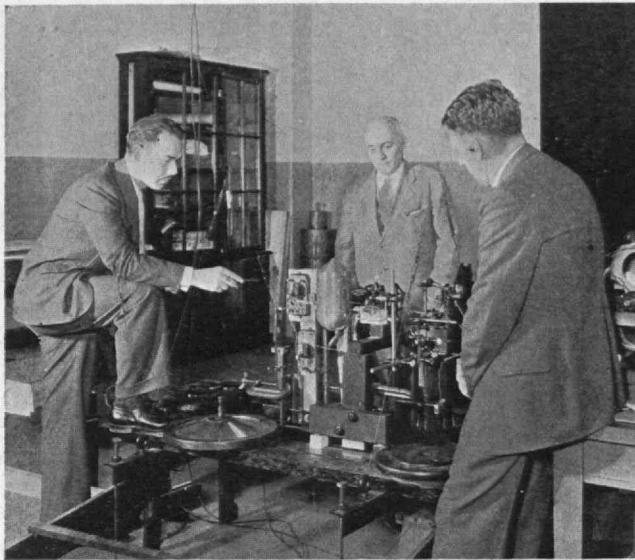
THOSE who have struggled over the solution of multiple simultaneous equations, be they students in elementary algebra or engineers designing great structures, will welcome the news that renewed efforts are being made to design practical machines to do the solving. Already an experimental mechanical device (see illustration below) has been constructed for handling three simultaneous equations and so satisfactorily has it demonstrated the validity of its principles that tentative designs and detailed drawings have been made for a machine to solve any number of linear equations up to ten, each with ten or less unknowns.

John B. Wilbur, '26, Assistant Professor of Civil Engineering at Technology, assisted by I. E. Madsen, '32, and working under the direction of Dean Vannevar Bush, '16, has developed this new analytical tool as a part of the Institute's general research program in the field of calculating machines — a program which has resulted already in the creation of such remarkable instruments as the differential analyzer, network analyzer, and cinema integrator.

Because the labor involved in the solution of simultaneous equations may render an otherwise workable method of analysis cumbersome, or even impractical, such a machine would be of great value to structural engineers. Coast and Geodetic engineers would also find it a boon in the adjustment of triangulation. By using successive approximations, arbitrary accuracy of results may be obtained without requiring much extra time. It is hoped, however, that results sufficiently accurate will be obtained from one set of readings.



Here is another contribution to the mechanization of menial mathematical labor — an experimental device for solving three simultaneous equations. Its successful operation in the Civil Engineering laboratories points to the practicability of a ten-equation machine. See above



M. I. T. Photo

Demonstrating that present-day water tank towers are not designed properly to resist earthquakes. Arthur C. Ruge, '33 (left), is demonstrating to Commander N. H. Heck (center), chief of the Division of Seismology and Terrestrial Magnetism of the U. S. Coast and Geodetic Survey, how he tests a modern tank on a shaking table which simulates earthquakes. Safer designs will come, predicts Mr. Ruge (see below)

Highly complicated in appearance, the machine will be about 30 inches high by 30 inches wide by 7 feet long. It will weigh about 1,000 pounds, and be semi-portable. Some idea of its intricacy may be obtained from the fact that it will require over 1,000 ball-bearing pulleys; about 600 feet of flexible steel tape; 120 vernier scales. It is direct in its principle, reproducing mechanically the geometric conditions of the set of equations to be solved.

Consideration is being given to other types of machines for the same purpose. The Englishman, R. R. M. Mallock, has worked on an electrical machine, and Dean Bush is studying this approach. Other mechanical solutions have been suggested, but Professor Wilbur's three-equation machine is probably the first practical one to be built and tested.

Tanks and Earthquakes

THE horrific aftermath of every major earthquake lies in the prospect of fire and disease over devastated regions where public water supplies have been cut off or contaminated by the disaster.

Seeking to minimize this menace to populations in areas subject to seismic disturbance, Factory Mutual Fire Insurance Companies has sponsored a study at M.I.T. of earthquakes and their effect on elevated water tanks. Arthur C. Ruge, '33, Research Associate in the Laboratory of Seismology of the Department of Civil and Sanitary Engineering, built a model of a 60,000 gallon, 100-foot tower tank on a 1 to 50 scale, tested it by means of miniature artificial quakes produced by a shaking table, and discovered weaknesses.

In a first report, Mr. Ruge finds: "Present methods of designing elevated tank towers to resist earthquakes" are "considerably on the unsafe side. They do not even

give a general indication of the actual stresses." Paradoxically, "moderate strengthening of a tower has practically no effect upon its earthquake resistance. Such resistance will in some cases be actually lowered by strengthening the tower." He likens it to riding in an automobile over a very bumpy road with the body held rigid, and stiffened muscles make the ride much worse because they fight every bump.

If tank towers are to be made quake-proof, a radical departure must be made in their design, predicts Mr. Ruge. Toward the development of such a resistant structure he will devote further study.

The tank model employed is of aluminum, five inches in diameter, and holds about two-and-a-half quarts of water, weighing five pounds. In contrast, the full-sized tank is 20 feet across, contains 60,000 gallons, weighs half a million pounds. Every motion of the model and the simulated earthquake are magnified and recorded photographically. After each test, which takes but a few seconds, the record is developed like an ordinary camera film for study at leisure.

For obvious reasons, the use of models in engineering research is becoming more and more popular. Easy to build and test, they are comparatively inexpensive, yet give an excellent reproduction in miniature of the behavior of the full-sized structure. Events happen faster and the motions are smaller, but these differences are taken care of by well-known laws of similitude.

Outstanding among model studies at Technology are the network analyzer developed in the Department of Electrical Engineering, which condenses entire power systems within laboratory walls; Professor Kenneth C. Reynolds' ('25) miniatures of the Connecticut River, Cape Cod Canal, and Winthrop seawall, in which he studies water flow and soil erosion; and airfoil models employed by the Division of Aeronautical Engineering in research on aircraft design.

Saving Fuel

STEAM, most common source of power and generally looked upon as most simple in its development and utilization, is, on the contrary, most complex. Until 13 years ago accurate scientific knowledge of its behavior at pressures greater than 200 pounds per square inch did not exist, but in the past decade research on the properties of steam has made possible its use at pressures of 1,200 pounds per square inch with a consequent enormous saving in fuel.

Investigations which resulted in such an achievement started in 1921, when a small group of scientists and engineers gathered at Cambridge, Mass., to discuss discrepancies in the experimental data needed for the design of steam turbines. A plan of research was proposed and the project was divided into three parts, under the sponsorship of the American Society of Mechanical Engineers. To Dr. Frederick G. Keyes, Head of the Institute's Department of Chemistry, fell the important study of pressure, volume, and temperature relations. To Dr. Harvey N. Davis, then at Harvard and now President of Stevens Institute of Technology, was assigned the investigation of the Joule-Thomson effect, while research in the specific heat of

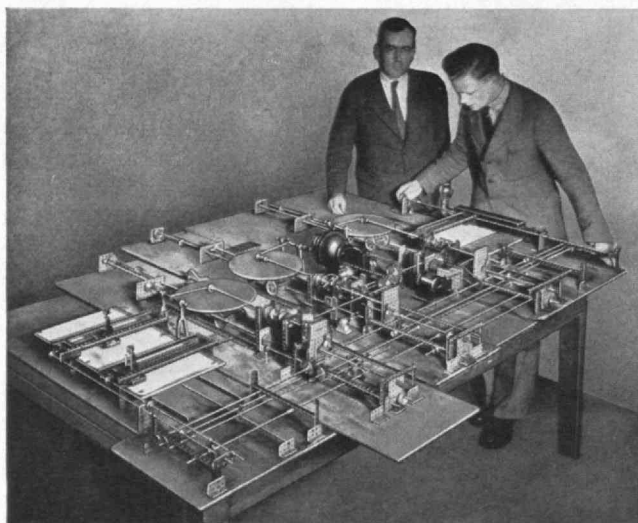
water, heat of evaporation, and mechanical equivalent of heat was undertaken by Dr. Nathan S. Osborn of the United States Bureau of Standards.

The task of this group was far more comprehensive than the actual laboratory work, for it was early recognized that international understanding and acceptance of the data produced were necessary for its most efficient application in the generation and application of steam.

As the research progressed, international conferences were held and the importance of the undertaking attracted world-wide interest. Of what was being accomplished, the lay public heard little, but scientists and power company engineers watched every step of the studies. By 1923, two years after the research was started, the experimental work had been carried into the pressure zone of 600 pounds to the square inch at 650° Fahrenheit and the first steam turbine operating at 600 pounds pressure was placed in service in 1924. Two years later a machine operating at the astonishing pressure of 1,000 pounds to the square inch was installed. Designers, dependent upon the data gathered by the researchers, kept pace, and in 1926 a turbine whirled to a new power efficiency record under a steam pressure of 1,200 pounds to the square inch.

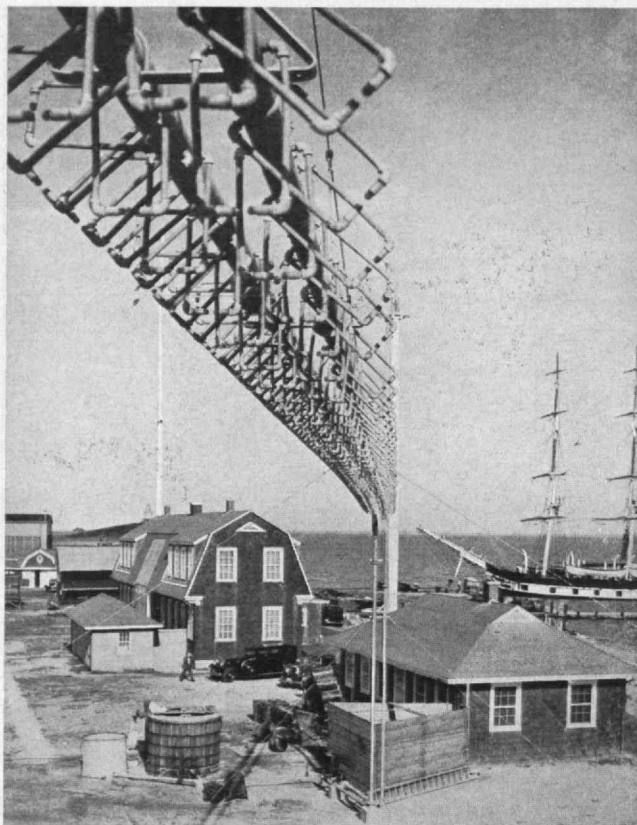
In terms of fuel economy, the savings effected as a result of all this endeavor are striking. From 3.2 pounds of fuel per kilowatt hour in 1919, fuel consumption has decreased to less than 1.65 pounds at present. It is estimated that the annual savings in the United States alone now amount to \$40,000,000.

For the time being, further advance toward even greater efficiency through the use of higher steam pressures awaits the achievement of the metallurgist. New and stronger alloys capable of standing enormous pressures are needed and probably will be forthcoming.



Guttenberg, Ltd.

When Dr. D. R. Hartree of the University of Manchester in England wanted to examine the usefulness of Technology's famous differential analyzer for atomic computations, he built this interesting model from Meccano parts. Though crude, it worked and Dr. Hartree proceeded with the construction of a full-sized adaptation from specifications furnished by Dean Bush. Other adaptations of the Technology analyzer are being built at the Astrophysical Institute at Oslo (for astronomical calculations), and at the Universities of Pennsylvania and Texas



Christian Science Monitor

Fog's worst enemy: the nozzles of Technology's fog dissipator. In the background are the fog laboratory at Round Hill and the old whaling ship which Colonel Green has preserved for public inspection

Meanwhile, the work of this phase of the steam-table research is drawing to a close. The third international steam-table conference was held recently: its first session in Washington, its second at Technology, and the third in New York. Final reports are now being prepared, and while the metallurgist bends over his furnaces, industry is designing new high pressure turbines from the information already available.

Aside from its significance as a great scientific and industrial achievement, this program presents a happy illustration of straightforward coöperation in research and an international exchange of technical information which brings advances that are correspondingly world-wide in their scope.

N. R. C. Fellows

BY LEADING the educational institutions of the country in the number of National Research Council Fellows enrolled in its Departments of Chemistry and Physics, Technology again demonstrates the high place it holds as a center of research in these fields. In total numbers of Fellows, the Institute, with nine, stands second only to Princeton.

In the Department of Physics, Dr. Chester M. Van Atta, who received his doctorate from New York University, is carrying on nuclear research. Dr. Andrew McKellar of the University of California is engaged in a study of intensities in band spectra, and Dr. George H. Shortley, Jr., of Princeton is working on problems of

atomic and molecular structure. The absorption spectra of polyatomic molecules in the far ultraviolet is the subject of investigation by Dr. Charles A. Bradley of Columbia University.

The remaining five Fellows are carrying on equally abstruse researches in the Chemistry Department. Dr. Ralph R. Hultgren, who was awarded his Ph.D. from California Institute of Technology, is at work on the crystal structure of alloy systems. Dr. Carston C. Steffens of the same institution is studying the band spectra of the hexafluorides of sulphur, selenium, and tellurium.

While Dr. George E. Kimball of Princeton studies the application of quantum mechanics to chemistry, Dr. Edward S. Gilfillan, Jr., of Harvard is engaged in the separation of isotopes. Dr. John F. G. Hicks, Jr., of the University of California has taken as his subject the heat capacities and entropies of salts and entropies of aqueous ions.

From the Counting Room

LAST June news of the appointment of Horace S. Ford as Treasurer of the Institute was received with universal approbation by the Technology community. Last month his first annual report, covering the year ended June 30, 1934, presented to the Corporation, likewise evoked comments of approbation and satisfaction, for out of the necessary welter of schedules, running almost the entire gamut of the alphabet and occupying 74 pages of eight-point type, emerged the salient fact that the Institute had completed another year on the proper side of the ledger.

Before looking at a few important details of this report, it is helpful to recall the conditions which surrounded last year's financial planning.

The operating budget of the Institute was set up and approved by the Executive Committee about April 1, 1933; that is, three months before the year started. It called for more careful consideration than any of its predecessors. Another drop in registration was anticipated, but the actual number of students expected was exceedingly difficult to estimate.

Also there was no assurance of the amount of income that might be expected during 1933-34 from the changing list of investments — a new hurdle to overcome, for in previous years this item could be estimated with reasonable certainty.

As these two items made up over 90% of the Institute's operating income, it is apparent that appropriations set up at that date to cover the whole year ahead were based largely on fond hopes — and on the Salaries Reserve Plan.

The latter went into action again at the start of the year, setting aside 10% of all salaries over \$500, from President to messenger boy, against probable falling income. But by October, 1933, some of those fond hopes were realized: more students than expected had appeared and additional income from the burdened investment list crept into the picture. Thus the Salaries Reserve Plan was again discontinued for the balance of the year, and the entire amount already reserved was returned pro rata.

(Continued on page 68)

BENDING MOMENTS

WHISKER density, or rather the incidence of beards, among the Institute's Faculty was the subject of an animated conversation at a luncheon of clean-shaven Institute folk the other day. Our curiosity, idling in neutral, was aroused and we set about to gather a few whiskery facts from mouldy volumes of *Technique*. We got 'em, too, and here they are.

Forty-six per cent of the Faculty as pictured in the *Technique* dated 1900 displayed beards of varying degrees, mostly rather underbrushy. Fifty-one per cent paraded mustachios, and only *one** out of the entire lot was clean-shaven.

Now take 1934. Only 3% of the Faculty is bearded and 22% mustached, leaving 75% wholly unadorned. And what beards there are, are very modest, or like a corn field in the drought area. Nothing like the voluptuous exfoliations of 1900, with maybe one exception. We got the facts for 1910 and 1920, too, just to show the trend. To satisfy our tropism toward tabulation, here is the whole story in this form:

	1900		1910		1920		1934	
	No.	%	No.	%	No.	%	No.	%
Beards.....	25	46	22	24	11	7	8	3
Mustaches.....	27	51	42	46	58	39	51	22
Clean.....	1	3	27	30	81	54	171	75
	53	100	91	100	150	100	230	100

DURING the summer doldrums we observed with astonishment several well-known members of the Institute staff playing with profound attention one of childhood's simple games. At least we thought it simple until we were lured to play and humiliated by inevitable defeat.

The game, by some erroneously called Fan-Tan (at least three games are called Fan-Tan!) but rightly called Nim, is played with matches, tooth picks, or any other easily available objects. Three piles, each containing a different number, are placed upon the table, and two players alternatively remove any number of objects (at least one must be taken) they choose from any one pile at each play. The purpose is to try, as the objects are reduced in number by successive removals, to be the player taking up the last one.

There is, it seems, a completely worked out mathematical procedure for playing, which, if properly employed by those in the know, makes it impossible for the uninitiated to win. Would you like to know the technique? Judging from the avid interest in Professor Woodruff's articles on the mathematics of bridge (see page 61), there are many who do not hesitate to go mathematical in their games, even at the risk of heavy cerebration. If you wish to know how to play Nim scientifically, and promise to use the information strictly as an amateur, the Quidnuncs will be happy to supply authoritative directions upon receipt of a stamped, self-addressed envelope.

THE QUIDNUNCs

* Name supplied upon request.

These factors, plus the complete coöperation on the part of all officers, members of the staff, and employees of the Institute, made it possible for Treasurer Ford to advise the Corporation that all commitments for the year had been met from the income received and that there was a small balance remaining — a faint trace of black ink, true, but black at any rate.

His report shows that capital gifts for the year reached a new low, \$87,000, being exceeded by the total of gifts for current and special purposes — a rare occurrence. The net yield to all funds was 4.53%, compared with 4.47% in 1932-33, and 4.54% the year preceding. Further significant details may be summarized under the following headings.

A. Financial Result of Operation. Gross expense exceeded gross income by \$234,038.94, but there was available to meet this from special funds, contributions, and previous years' appropriations, \$234,705.94; also a profit from previous years' operations of \$4,881.31. This resulted in a balance of \$5,548.31, which was applied to the reduction of the Institute's modest all-time deficit. This latter now stands at \$29,878.04. With unrestricted funds on hand exceeding \$500,000, this deficit occasions no great concern at present.

B. Operating Income. Gross income increased \$26,000 to \$3,288,000, but net income fell off \$131,000 (5%) to \$2,646,600. Income from students was \$155,000 (10%) less, with registration falling from 2,831 to 2,606 (about 8%).

Gross income from investments was down \$19,000 to \$1,427,000, but net income available for budget expenditures from this source was reduced but \$17,000 to \$1,213,000.

C. Operating Expense. Academic expenses were reduced \$176,000 (9%) to \$1,683,000, the larger part of which was in the Teachers' Salary account, \$156,000, "not through salary reductions, but by reduction in the staff due to withdrawals and retirements."

Administration expenses were reduced \$3,000 to \$310,700, plant operations were up \$3,000, due entirely to the charge of \$14,400 against the Power Plant, representing one-third of the cost of conversion to oil-burning. Apart from this, maintenance costs were reduced without detriment to plant or facilities.

D. Treasurer's Balance Sheet. The statement of the Institute's assets and liabilities showed considerable change. The endowment funds principal has been reduced \$882,700, due to changes in the investment list. The total stands at \$31,848,000. As stated, this is "due largely to restoring to the Endowment Reserve Fund all profits from previous sales and maturities which were credited to the funds in 1930." Also a number of non-income producing securities were sold and the proceeds invested in more than 20 of the best common stocks. This occasioned a decrease in book value of the principal, but this decrease was met out of the Endowment Reserve Fund, augmented as described. The original principal of all Endowment Funds in the Institute list stands intact. The Endowment Reserve Fund now totals \$526,338.35.

Student loan receivables have increased from \$462,000 to \$629,000 during the year. This item will continue to increase until the Loan Fund becomes truly revolving.

Current liabilities decreased \$50,000 to \$223,000, largely because of the reduction in minor and special fund balances applied to their specified projects.

For the first time in many years, there is no change whatever in the Educational Plant capital, which stands at \$15,203,000.

E. Miscellaneous Items. Of the total of \$1,282,194.63 received from students for tuition during the year, \$341,000, or approximately 27%, was provided by undergraduate scholarships, graduate scholarships, or student loans. Last year the figure was \$336,000, representing 23% of the total.

The income from the miscellaneous student fees (locker, entrance examination, condition examination, late registration) totaled \$9,324, a drop of \$2,000.

The net income from dormitory operation fell off \$10,000 to \$28,384.80, due largely to extensive repairs in the three units along Ames Street. This represents a yield of slightly over 2% upon the capital invested.

The amount of income received under Federal Land Grant Acts remains, as in previous years, \$22,255, less than 1% of the total income.

The operation of the Power Plant in its first year of oil-burning was particularly gratifying. Except for the charge against it representing one-third of the cost of conversion to oil-burning, the actual expense for the year was less than in the previous year despite the lower temperatures of last winter.

Operation of the Dining Service for the year was particularly difficult and it was obliged to draw upon its reserve fund (accumulated from previous earnings) to the extent of \$1,159.75. The receipts fell off about \$5,000, the total business being \$91,000. The usefulness of the service, however, is amply demonstrated by the fact that there were 609 special luncheons, dinners, meetings, dances, and other functions with 45,113 persons in attendance. These were taken care of in addition to the regular meals, as against 440 functions with 38,400 persons in 1932-33. Walker Memorial has thus increased its special functions but the number of students who bring their lunch, or prepare their meals in the dormitory rooms, or obtain provender otherwise makes for a patronage much below capacity. The regular meal check averaged about 30 cents.

DETAILS on two funds which are separated from the general funds of the Institute were also included in Mr. Ford's presentation to the Corporation. Charles Hayden, '90, reporting for the Technology Loan Fund Committee, showed total receipts from contributors and earned income \$1,233,885.54, with total requisitions by the Loan Board for student aid \$586,217.98, leaving a balance of \$647,667.56. The amount requisitioned for the year, \$169,190.05, was under that of the preceding year and the amount needed for fiscal 1935 will be still less.

The Loan Board made loans to students during the year totaling \$202,835. Repayments of principal amounted to \$35,166.22 and of interest \$9,191.73. The current year will see greatly increased student note maturities and if the present trend continues, the figures for both principal and interest payments should be substantial. (Continued on page 75)

MORE IMPORTANT THAN ANY MATERIAL THING



MORE important than millions of telephones and millions of miles of wire is the fundamental policy of the Bell System. It is founded on a spirit of fair dealing with the public, with employees and with those who have invested their money in the business.

• • •

"The fact that the responsibility for such a large part of the entire telephone service of the country rests solely upon this Company and its Associated Companies also imposes on the management an unusual obligation to the public to see to it that the service shall at all times be adequate, dependable and satisfactory to the user. Obviously, the only sound policy that will meet these obligations is to continue to furnish the best possible telephone service at the lowest

cost consistent with financial safety. This policy is bound to succeed in the long run and there is no justification for acting otherwise than for the long run. . . .

"Earnings must be sufficient to assure the best possible telephone service at all times and to assure the continued financial integrity of the business. Earnings that are less than adequate must result in telephone service that is something less than the best possible. . . . The margin of safety in earnings is only a small percentage of the rate charged for service, but that we may carry out our ideals and aims it is essential that this margin be kept adequate. . . . This is fundamental in the policy of the management."

Quoted paragraphs from an address by Walter S. Gifford, president of the American Telephone and Telegraph Company, at Dallas, October 20, 1927.

BELL TELEPHONE SYSTEM





Luminall Paint Is Not Affected By Acid Fumes or Alkalies

IN ADDITION to the advantages of Luminall paint which are listed at the top of this column, it should also be remembered that it is unaffected by acid fumes or alkalies — important to most industrial plants.

One coat of Luminall absolutely covers. Depending on the material being painted, one gallon of Luminall covers from 300–700 square feet of surface.

Write today for complete data on this paint which is being used by so many of the nation's largest concerns.

NATIONAL CHEMICAL & MFG. CO.
3617 South Wall St., Chicago

Mfg. in Canada by Standard Paint & Varnish Co., Ltd., Windsor, Ont.

LUMINALL

MAIL RETURNS

Pyramid Leaping

DEAR REVIEW:

I HAVE just finished reading . . . the thought-provoking letter from Mr. John C. Sherman included under *Mail Returns* in the October Review.

There were many of his statements with which we must all agree. His general approach to the subject of education, however, seemed to me much on a par with the daily comments which are heard regarding the "New Deal." Practically all of these comments are based upon individual cases and, as such, may be twisted to prove the argument of the individual making them. It is certain, however, that no fundamental principle can be proved by pointing to individual and chance observations, and it is equally true that many false and misleading ideas may thus arise.

I believe that the success of our educational institutions should be measured not so much by our individual successes or failures, but more by the relative accomplishments of the great mass of our university-trained group. In other words, I feel that statistics are our best measuring medium. It is not necessary for me here to attempt to cover the great volume of statistics regarding the general success* of our higher educational processes, as these are readily available in any good reference library and many excerpts from them have appeared in past issues of *The Review*. . . . Evidently then, there is something to be gained from a college education by the average student.

It seems unlikely that all of the prospective students who interview Mr. Sherman are budding geniuses, and the facts seem to indicate that he is doing many of them a distinct disservice in advising them to forego a college education.

But let us examine the case of the geniuses with whom he has come in contact. We are led to believe by his convincing letter that the brilliance of these men would be warped by the monotonous, grinding routine of the advanced technical school. Unless I mistake all the signs, the problem of the exceptional student has for the past few years been very much to the fore in our universities and particularly at M.I.T. There has resulted a great increase in the latitude of the choice of work for these students with the result that they are not generally tied to any definite routine whatsoever. They are encouraged to follow their own bent and are given every aid in doing so. They have available for consultation and advice a large group of professors, specialists in their line, who can and do straighten out many a knotty point in one-third to one-quarter of the time that it would require even a genius to obtain the information from reference material. These students are thus enabled to cover ground at an accelerated pace and their work is so guided as to build up in them a thorough knowledge of (*Concluded on page 72*)

* Example: Of the names listed in the current edition of "Who's Who in America," 85% are college trained. — Editor.

ALUNDUM

(TRADE-MARK)

UNTIL the invention of the electric furnace, nature was without competition in the production of such minerals as emery, corundum and gems such as the ruby, sapphire and the diamond.

More uniform in purity than emery and corundum, in chemical composition not unlike the ruby and sapphire and with a hardness approaching the diamond, are the products of Norton electric furnaces—Norton Abrasives—trade-marked Alundum.

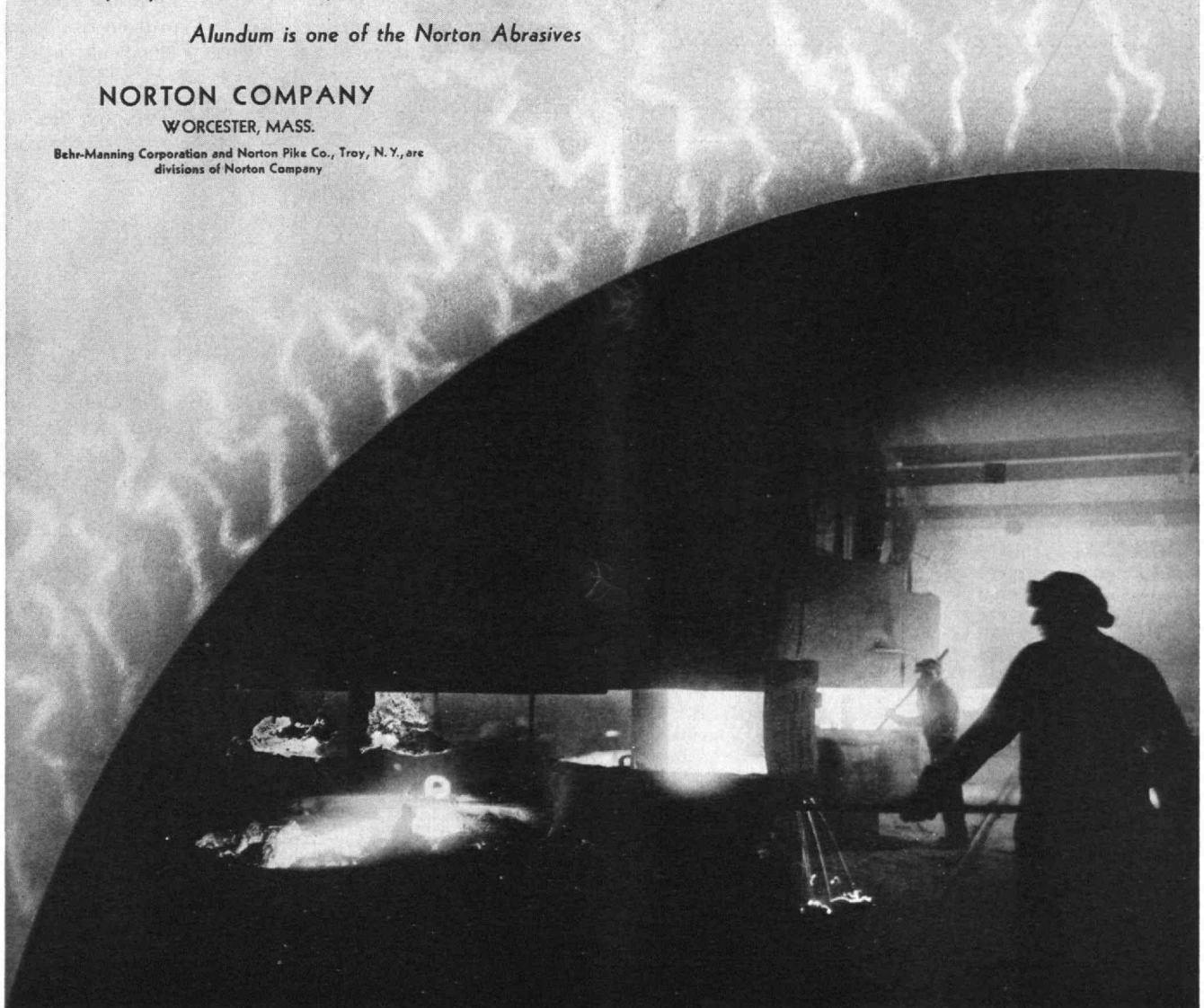
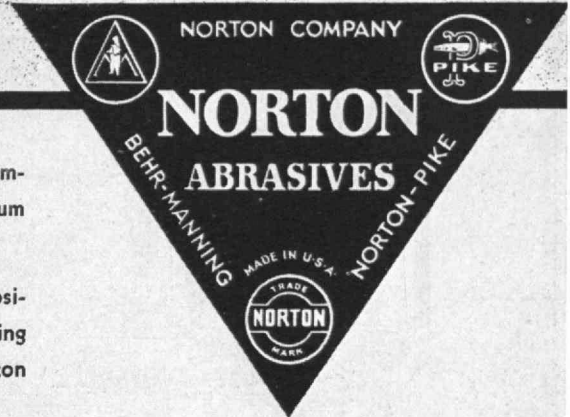
Alundum grinding wheels, primary tools for the metal industry . . . Alundum sharpening stones, rubbing bricks and sticks for workers in metal and stone . . . Alundum abrasive grains for polishing and lapping . . . Alundum tiles, treads and aggregates solve the walkway safety problem in the building industry . . . Alundum refractory ware—cores, crucibles, combustion boats, filtering utensils, and refractory cements for the laboratory . . . Alundum refractory bricks, plates, muffles, tubes, batts, saggers, blocks and many miscellaneous shapes for the larger uses in heat control . . . Norton pulpstones convert wood into wood pulp for newsprint . . . Abrasive paper and cloth ("sandpaper") found in homes, shops and factories everywhere.

Alundum is one of the Norton Abrasives

NORTON COMPANY

WORCESTER, MASS.

Behr-Manning Corporation and Norton Pike Co., Troy, N. Y., are divisions of Norton Company





New England's Famed Gateway to Graciousness

Through the portals of the COPLEY-PLAZA pass the people who appreciate a hotel where they can *live* instead of just "stop" . . .

. . . where the service is quiet and efficient instead of garrulous and effusive—where the atmosphere (that indescribable something which hotels acquire through long service to people of means and manner) is more in keeping with the finest domestic traditions.

You will enjoy *living* at the COPLEY-PLAZA. You will enjoy it because it creates for your trip away from home the natural and unassuming hospitality of the environment to which you are accustomed. Rooms as low as \$4.00.

THE COPLEY-PLAZA • BOSTON

ARTHUR L. RACE



Managing Director

CINUCOR MASONRY UNITS



A tested, approved masonry unit with clean, straight edges and corners; fine close-knit texture and color that is definite and true. With a high value of insulation, sound-proofness and fire-proofness. For load-bearing and non load-bearing walls.

Special Aggregate for Construction

To save weight without loss of strength, use CINUCOR AGGREGATE—refined by special process for use in concrete.

CINDER CONCRETE UNITS CORPORATION
P.O. Box A, Winter Hill Somerville, Mass.

Som. 2752



CINUCOR

Send for Manual

MAIL RETURNS

(Concluded from page 70)

mathematics and the fundamental principles of physics and chemistry, together with that more important fundamental, an orderly method of approach to scientific, industrial, or business problems.

If we were to accept Mr. Sherman's opinion, we would be led to believe that an untrained boy without the background of the basic scientific fundamentals and with little knowledge of advanced mathematics can and will arrive at more valuable scientific conclusions than a boy of equal intelligence who has these tools to work with, simply because the untrained boy's outlook is untainted by the prostituting influences of tradition! I doubt it.

Such a view is not in line with the way in which scientific advance is made today. Certainly the more usual method and that which has so greatly accelerated our modern technological advance is one in which all available and proven data from the past is used as a foundation from which to reach out into the unknown and add another stone to the pyramid of knowledge. It seems inconceivable to me that we can make greater progress by encouraging geniuses to leap from the base of the pyramid in an attempt to cap the peak rather than by leading them to the upper steps and leaving them to carry on.

M. W. DAVIDSON, '26.

210 Pine Street
Harrisburg, Pa.

FARADAY INVESTIGATES TABLE-TURNING

(Continued from page 60)

In order to satisfy the popular clamor by something more than a personal opinion, Faraday appears to have conducted a serious experimental investigation. This was reported in the *Athenæum* of July 2, 1853, and reprinted in his *Experimental Researches in Chemistry and Physics*. In the introductory paragraphs his position is thus made clear:

The object which I had in view in this inquiry was not to satisfy myself, for my conclusion had been formed already on the evidence of those who had turned tables, — but that I might be enabled to give a strong opinion, founded on facts, to the many who applied to me for it. Yet, the proof which I sought for, and the method followed in the inquiry, were precisely of the same nature as those which I should adopt in any other physical investigation.

It is with me a clear point that the table moves when the parties, though they strongly wish it, do not intend, and do not believe that they move it by ordinary mechanical power. They say, the table draws their hands; that it moves first, and they have to follow it, — that sometimes it even moves from under their hands. . . . Though I believe the parties do not intend to move the table, but obtain the result by a *quasi* involuntary action, — still I had no doubt of the influence of expectation upon their minds, and through that upon the success or failure of their efforts.

(Concluded on page 74)

ESTABLISHED 1818

Brooks Brothers,

CLOTHING,

Gentlemen's Furnishing Goods,

MADISON AVENUE COR. FORTY-FOURTH STREET
NEW YORK

Styles that Survive

While new articles are constantly being added to Brooks Brothers' stocks each season, there is, perhaps, at the same time, a steadier continuation of styles and materials already established by us than is generally found elsewhere. This is due to extremely careful selection in the first place, and to equally careful production throughout. To our customers it means, of course, longer satisfaction in wearing anything bearing Brooks Brothers' label, with style surviving not only for the life of the article, but in many instances, through various replacements thereof.

Ready-made suits \$55 to \$85

BRANCHES

NEW YORK: ONE WALL STREET
BOSTON: NEWBURY COR. BERKELEY STREET



© Brooks Brothers

Paul Brown

INFORMATION ON M. I. T.

THE TECHNOLOGY REVIEW BUREAU exists to supply authoritative information to anyone interested in details regarding the Massachusetts Institute of Technology. It serves as a clearing house for inquiry and aims to further the spread of exact information regarding entrance requirements, outline of courses, subjects of instruction and other information which may be of aid to the students considering undergraduate or graduate study at the Institute.

The Institute publishes a variety of bulletins, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

Ask for the following pamphlets by their descriptive numbers

- | | | | | |
|--|---|---|--|---|
| 1: For general information, admission requirements, subjects of instruction, ask for Bulletin 1. | 2: For announcement of courses offered in Summer Session, ask for Bulletin 2. | 3: For information on courses in Architecture, both Undergraduate and Graduate, ask for Bulletin 3. | 4: For information on Graduate Study in Science and Engineering, ask for Bulletin 4. | 5: For a popular presentation of Educational Opportunities offered at M.I.T., ask for Bulletin 5. |
|--|---|---|--|---|

All inquiries sent to the address below will receive prompt attention

THE TECHNOLOGY REVIEW BUREAU

ROOM 11-203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.

HAVE YOU MADE YOUR WILL?

This is the only way to make sure that your estate will be distributed in accordance with your wishes and not as inflexible inheritance laws decree. Our Trust Department is thoroughly qualified to carry out your wishes in the capacity of Executor or Trustee. *Booklet sent on request.*

State Street Trust Company

BOSTON, MASS.

MAIN OFFICE

CORNER STATE and CONGRESS STREETS
Copley Square Office: 581 BOYLSTON STREET

Massachusetts Avenue Office:

Cor. MASSACHUSETTS AVENUE and BOYLSTON STREET

MEMBER FEDERAL RESERVE SYSTEM

Technology Alumni . . .

JOIN THE MARCH TO WALKER MEMORIAL

THE number of alumni functions, undergraduate dances and dinners held in Walker Memorial has increased from 185 in 1927-1928 to 609 in 1933-34, or 228 per cent; number of guests attending from 12,832 to 45,113.

Your class smoker or dinner will receive the same courteous reception which has resulted in this phenomenal growth of Walker Memorial as a social center for all Technology men.

MENUS SUBMITTED ON REQUEST

Address A. W. BRIDGES

WALKER MEMORIAL DINING SERVICE

M. I. T.

Cambridge, Massachusetts

FARADAY INVESTIGATES TABLE-TURNING

(Concluded from page 72)

After describing his use of many different materials, conductors and nonconductors — which, however, produced uniform results under the hands of the table-turners — Faraday does not hesitate to assert:

Neither during their use nor at other times could the slightest trace of electrical or magnetic effects be obtained. At the same trials it was readily ascertained that one person could produce the effect; and that the motion was not necessarily circular, but might be in a straight line. No form of experiment or mode of observation that I could devise gave me the slightest indication of any peculiar natural force. No attractions, or repulsions, or signs of tangential power, appeared, — nor anything which could be referred to other than the mere mechanical pressure exerted inadvertently by the turner.

While courteously disclaiming all doubt of his subjects' sincerity, he proceeds to analyze the pressure he believed exerted by their hands, and gives a full description of the tests employed. Briefly, the apparatus consisted of a recording of the change in position of certain loosely cemented cardboard discs, which in every trial registered a greater pressure on the upper card. This satisfied Faraday that the lower discs and the table followed the hand, and that the table had not drawn the hand or moved simultaneously with it.

As a next step he devised an indicator — on the lever and fulcrum principle — with a gauge to show the relative motion of table and hands. Conclusive proof was thus established, since, whenever the indicator was placed within their view, the table-turners could see for themselves the plain evidence of their involuntary pressure. "The most valuable effect of this test-apparatus," says Faraday, ". . . is the corrective power it possesses over the mind of the table-turner. As soon as the index is placed before the most earnest, and they perceive — as in my presence they have always done — that it tells truly whether they are pressing downwards only or obliquely, then all effects of table-turning cease, even though the parties persevere, earnestly desiring motion, till they become weary and worn out. No prompting or checking of the hands is needed — *the power is gone*; and this only, because the parties are made conscious of what they are really doing mechanically, and so are unable unwittingly to deceive themselves."

Faraday concludes this report of his patient investigation like a true scientist, with the declaration:

I must bring this long description to a close. I am a little ashamed of it, for I think in the present age, and in this part of the world, it ought not to have been required. Nevertheless, I hope it may be useful. There are many whom I do not expect to convince; but I may be allowed to say that I cannot undertake to answer such objections as may be made. I state my own convictions as an experimental philosopher, and find it no more necessary to enter into controversy on this point than on any other in science, as the nature of matter, or inertia, or the magnetization of light, on which I may differ from others. The world will decide sooner or later in all such cases, and I have no doubt very soon and correctly in the present instance.

THE INSTITUTE GAZETTE

(Continued from page 68)

The statement of the Trustees of the Pension Association, also included in the Treasurer's Report, indicates that the baby of 1926 is becoming quite a youngster — and a rather healthy one, too. Its assets have passed the \$800,000 mark and a consideration of its financial condition, particularly of its list of securities, should give some comfort to the 300-odd officers and members of the staff who are presumably accustomed to seeing those "What about your Old Age" advertisements with which insurance and annuity companies sprinkle the magazine pages of today.

Outside interested agencies were extremely critical of the entire Pension Plan when it was inaugurated, and there was some reason for their doubtful attitude. Without indulging in any "dividends of conjecture" as to the ultimate success and usefulness of the whole plan, it seems fair to record at this writing that the experience of the past seven years has been in every respect more favorable than the Trustees dared to contemplate.

Expansion in Graduate Housing

TO MEET the lively demand for residence in the Institute's Graduate House, three dormitory units, — Ware, Atkinson, and Runkle — have been added this autumn to the original group of Holman, Nichols, and Crafts. The addition increases the house capacity from 76 to 206 students. The popularity of the graduate housing plan, which was begun only last year, is further indication of the desirability of closer social contacts between advanced students in various professions.

The three new units, which were completely redecorated and refurnished during the summer, offer interesting new features for the comfort and recreation of their residents. The Macomber Room, corresponding to the Crafts Library, has been furnished as a study and conference room for the fellowship group of graduates in the Department of Business and Engineering Administration. It contains a library of special interest to students of this course. Special facilities in Ware include a reading room, a small private dining-room available to all House residents, and in the basement, a game room for the use of graduates and undergraduates alike.

Employment — 1934

OUR Placement Bureau has completed a census of the graduates of 1934. Of these, 178 were awarded advanced degrees; 460, undergraduate degrees. Of the 638 students who received degrees last June, 58.6% are employed; 12.1% are planning to take advanced work; 22.1% are unemployed; and 7.2% failed to reply to notices sent them.

Under present conditions, it is considered reasonable to assume that those who have not replied to questionnaires and letters of inquiry from John M. Nalle, '20, Placement Officer, are satisfactorily placed. If this be true, the figures for those employed would be increased.

(Concluded on page 76)

Surely you'll want to make stopovers. It may be in Honolulu, Kobe, Shanghai, Manila, Bombay. Or perhaps at ports in Egypt or Europe.

President Liners let you stopover in any or all of the 14 countries in their Round the World itinerary . . . visit ashore or make sidetrips. Then continue on the next or a later of these liners that sail every week from New York to California, thence via Hawaii and the Sunshine Route, or via the fast Short Route from Seattle, to the Orient . . . and on fortnightly Round the World.

You may circle the globe by President Liner in no more than 104 days (85 days if you cross America by train). Or you may take the two full years your ticket allows.

**ROUND
THE
WORLD**
\$834
FIRST CLASS



Rickshas may be hired for thirty cents a day

President Liners are famed for easy-riding speed . . . and luxury and gaiety. Every stateroom is outside, large and airy, with real beds. Decks are long and broad, edging a variety of ample public rooms. There is an outdoor swimming pool on every liner.

Your own travel agent, or any of our offices (New York, Boston, Washington, D.C., Toronto, Chicago, Cleveland) will be glad to tell you *all* about the President Liners. They'll be happy to tell you too, of other President Liner trips . . . between New York, Havana, Panama and California (and the reverse) and to the Orient and back.

DOLLAR
Steamship Lines and
AMERICAN
Mail Line

THE INSTITUTE GAZETTE

(Concluded from page 75)

The figures of this census are considered most encouraging in view of the seasonal drop in business during the summer. Not only has a large percentage of the class found employment, but a surprising number are carrying on work in the various fields for which they were trained. As an indication of the trends of the moment, it is interesting to note the branches of engineering in which the largest number of graduates were placed. In the Department of Mechanical Engineering 79% of the graduates of 1934 are employed; Chemical Engineering follows with 76%; Civil and Sanitary Engineering has 70% employed; Business and Engineering Administration, 69%; and Electrical Engineering, 65%.

SIMPLEX CORDS, WIRES and CABLE

insulated with

RUBBER, PAPER,
CAMBRIC

*for all types
of electrical transmission*



SIMPLEX
WIRE & CABLE CO.

79 Sidney Street, Cambridge A
Boston, Mass.

In Alumni employment the Placement Bureau has in the past three months equalled the highest record for any similar period in the history of the office.

From Rogers' Steps

THE School of Architecture, justly proud of the distinguished architects it has contributed (no other school has graduated so many gifted architects) to the profession in America, has suffered distressing losses this year in its alumni ranks. Cass Gilbert, '80 (Woolworth Tower, U. S. Supreme Court Building, State Capitol in Minnesota); Raymond Hood, '03 ("eminent verticalist," Chicago *Tribune* Tower, Daily News Building, Rockefeller Center); A. Wadsworth Longfellow, '78 (buildings at Harvard and Radcliffe, Carnegie Library at Pittsburgh); and Alfred Elzner, '87 (pioneer in the use of concrete for buildings), to name only four, bequeathed lasting gifts to American architecture.

ARCHITECTURE and art are brothers and each has a place at the other's table. Witness the large group of notables in the fine arts who have received their training in our School of Architecture. Daniel Chester French, '71, sculptor of the "Minute Man" and other distinguished pieces, and Edwin H. Blashfield, '69, dean of American mural painters, are examples. In almost any selection of the first half-dozen American etchers, three would be alumni of the school. Samuel V. Chamberlain, '18, Louis C. Rosenberg, '13, John Taylor Arms, '11, and George C. Wales, '89, have distinguished themselves in this medium.

Chamberlain, it is interesting to note, has been commissioned to execute a series of 12 plates of Yale, and Rosenberg (who did a plate of Technology) a series of Harvard. There is a subtle implication not unapparent to Technology folk in these selections. Chamberlain, by the way, is giving instruction in sketching this fall, as he so successfully did last year, to students in the School of Architecture.

Registration

SIGNIFICANT is the fact that freshman enrollment this fall shows a marked increase over last year. A total of 549 registered, compared with a total of 485 last year. Total enrollment, as of October 6, stood at 2,511 compared to final figures of 2,606 last year. Significant also is the fact that 267 new graduate students entered this fall compared with 226 last fall, giving a total enrollment in the graduate school of 499.

GIRLS' SCHOOLS and JUNIOR COLLEGES

BRADFORD JUNIOR COLLEGE

Founded as Bradford Academy in 1803. Near Boston. Two-Year Liberal Arts College. Accredited for Advanced Work. Specialization in Art, Music, Dramatics, Home Economics. Superior Faculty. Modern Courses and Equipment. 40 acres. Indoor Swimming Pool; Riding, Golf.

KATHARINE M. DENWORTH, Ph.D., Box 15, Bradford, Mass.

CHOATE SCHOOL

A Country School in a Model Town near Boston.
For girls: Boarding 11 to 19; Day 5 to 19 years.
College Preparatory and General Courses.
Outdoor life.

Principal, AUGUSTA CHOATE, Vassar,
1600 Beacon Street, Brookline, Mass.

PREPARATORY SCHOOLS FOR BOYS

BERKELEY PREPARATORY SCHOOL

Established 1907

Special Preparation for M. I. T.

Harry F. Cade, Jr., '28, *Principal*

1089 Boylston Street, Boston

Tel. Commonwealth 9262

CHAUNCY HALL SCHOOL

Founded 1828. The School that confines itself exclusively to the preparation of students for the Massachusetts Institute of Technology.

FRANKLIN T. KURT, *Principal*, 553 Boylston Street, Boston, Mass.

CLARK SCHOOL

Prepares for and certifies to all colleges.

Classes average six students.

Instructors, men of experience.

Also offers Junior College Business Course.

Address: FRANK V. MORGAN, Ph.D., Hanover, N. H.

DWIGHT SCHOOL

72 Park Avenue, New York City

College and Regents' Preparation. 51st Year

ERNEST GREENWOOD, *Headmaster*

HEBRON ACADEMY

Thorough college preparation for boys at costs surprisingly low due to endowment and country location. Graduates in 32 colleges. Experienced faculty of 15 men. Excellent dormitory, classroom, laboratory and athletic equipment. For book, "Building Scholarship," address

RALPH L. HUNT, *Principal*, Box T, Hebron, Maine

HUNTINGTON SCHOOL FOR BOYS

Five Forms. Special two-year course for entrance to M. I. T.

Summer Session (Co-educational)

Send for catalogues

CHARLES H. SAMPSON, Ed.M., *Headmaster*

320 Huntington Ave., Boston

Tel. Kenmore 1800

MOSES BROWN SCHOOL

An Endowed New England School with an excellent record in preparing boys for leading colleges. 25-acre elm-shaded campus. Athletic Fields. Gymnasium. Swimming Pool. For *Illustrated Catalog Address:*

L. RALSTON THOMAS, *Headmaster*, 257-A Hope Street, Providence, R. I.

NEW HAMPTON SCHOOL

114th year. A New Hampshire School for Boys. Six Modern Buildings. Thorough College Preparation. Junior Course in Business. Athletics for Every Boy. Moderate Tuition. *Address*

FREDERICK SMITH, A.M., Box 198, New Hampton, N. H.

NORTHWOOD SCHOOL

In the heart of the Adirondacks. Under Lake Placid Club Education Foundation. Unusual success in college preparation. Emphasis on recreation that can be continued throughout life. Winter sports. Separate junior school for boys, 8 to 12.

IRA A. FLINNER, Ed.D., *Director*, Box T, Lake Placid Club, N. Y.

ROXBURY SCHOOL

CHESHIRE, CONNECTICUT

A small College Preparatory School that has sent 250 boys to leading colleges in five years.

A. N. SHERIFF, *Headmaster*

SELECTING A SCHOOL

Suggestions as to the best school or college for the educational development of a particular boy or girl. For information and advice address

WAYNE DAVIS, *Private School and College Educational Adviser*

14 Beacon Street, Boston

SHATTUCK SCHOOL

A Church school for boys. 73rd year. Stands high among schools for sound scholarship, manly character and Christian citizenship. Military training. Sends boys to M.I.T. each year.

Address The Headmaster, Faribault, Minn.

WESTMINSTER SCHOOL

College Preparatory and Junior Schools for Boys. Flexible Form System Adapted to Every Boy's Needs. 200 Acres; 20 Buildings; Gymnasium; Pool; Winter and Summer Sessions.

R. R. McORMOND, *Headmaster*, Simsbury, Connecticut

CATALOGUES

For any of the above schools will be sent on request.


Address

Business Manager, The Technology Review, M.I.T., Cambridge, Mass.

COPIES
OF ANYTHING **LIBERTY 3000**

WRITTEN TYPEWRITTEN
 PRINTED
 PHOTOGRAPHED or DRAWN

SPAULDING-MOSS CO.
 REPRODUCTION SPECIALISTS
 42 FRANKLIN STREET BOSTON MASS.



HARVARD ENGRAVING CO.
 MAKERS OF FINE
PRINTING PLATES

ENGRAVERS **H** **ILLUSTRATORS**

72 LINCOLN ST. Cor. ESSEX BOSTON MASS.




Transits and Levels are used on all largest works and by U. S. Govt. for utmost precision.
 New catalog, just issued, sent gratis

BUFF & BUFF CO. Boston 30, Mass.
 Handsome nickel bas-relief of a Buff Transit sent gratis to engineers

CHARLES H. JOHNSON
 M. I. T. '05

LIFE INSURANCE *✓ ✓ ✓* ANNUITIES
New England Mutual Life Insurance Company

80 FEDERAL STREET, ROOM 1300, *Liberty 0553*, BOSTON, MASS.

WILLIAM P. BERKELEY
 M. I. T. '27

Equitable Life Assurance Society of the United States

100 Milk Street, Boston *Hancock 6200*

MERRIMAC CHEMICAL COMPANY

Subsidiary of Monsanto Chemical Company

EVERETT MASSACHUSETTS

The largest and oldest chemical concern in New England

Founded in 1853

"STETS"

THE GOODYEAR TIRE AND RUBBER COMPANY
 says

"We have your equipment in our plant and it is working very satisfactorily."

"That's all"

STETS CO., INC. ■ **BOSTON**

BACK BAY ELECTROTYPE AND ENGRAVING CO.

MAKERS OF
 HALFTONE, LINE, MUSIC, MAP,
 AND DIAGRAM PLATES

ALSO A COMPLETE ART DEPARTMENT
 PHOTO RETOUCHING, DESIGNING, LETTERING, ETC.

172 COLUMBUS AVE., PARK SQ., BOSTON
 TEL. HANCOCK 8790

Special attention given to School Annual Work

Donald G. Robbins, '07 William H. Coburn, '11 William F. Dean, '17

William H. Coburn & Co.

INVESTMENT COUNSEL

68 Devonshire St. Boston, Mass.

THE RUMFORD PRESS

Concord, New Hampshire

✓ ✓ ✓

Makers of Magazines and Books of Distinction

PROFESSIONAL CARDS

JACKSON & MORELAND

Engineers

Public Utilities — Industrials
Railroad Electrification
Design and Supervision — Valuations
Economic and Operating Reports

BOSTON

NEW YORK

FAY, SPOFFORD & THORNDIKE

ENGINEERS

BOSTON, MASS.

BRIDGES

WATER SUPPLY AND SEWERAGE

PORT AND TERMINAL WORKS

FIRE PREVENTION

INVESTIGATIONS

DESIGNS

SUPERVISION OF CONSTRUCTION

H. K. BARROWS, '95

M. Am. Soc. C. E.

CONSULTING HYDRAULIC ENGINEER

*Hydro-electric developments — Water supplies. Reports, plans,
supervision. Advice, appraisals.*

6 BEACON STREET

BOSTON, MASS.

STANLEY G. H. FITCH '00

CERTIFIED PUBLIC ACCOUNTANT

of PATTERSON, TEELE & DENNIS
1 Federal Street, Boston, Mass.

AUDITS

INVESTIGATIONS

New York

Boston

Washington

Baltimore

EADIE, FREUND AND CAMPBELL

CONSULTING ENGINEERS

110 WEST FORTIETH STREET

NEW YORK CITY

PLANS AND SPECIFICATIONS — EXAMINATIONS AND REPORTS

Power, Heating, Ventilating, Electric, Plumbing, Sprinkler, Refriger-
ating, Elevator Installations, etc., in Buildings and Industrial Plants

J. K. CAMPBELL, M. I. T. '11

MAURICE A. REIDY

Consulting Engineer

STRUCTURAL DESIGNS

FOUNDATIONS

CONSTRUCTION CONSULTANT AND ARCHITECTURAL ENGINEER

Estimates and Appraisals

44 SCHOOL STREET

BOSTON, MASS.

BURTON W. CARY '08

MELVIN R. JENNEY '21

FISH, HILDRETH, CARY & JENNEY

Attorneys-at-Law

SPECIALIZING IN

PATENT AND TRADE-MARK PRACTICE

53 State St., Boston

Hubbard 2496

EVERETT E. KENT

PATENT LAWYER

Patents, Trade Marks, Copyrights

United States and Foreign

75 Federal Street, Boston

HUBbard 0234

ARCHIBALD H. SPAULDING '14

PHILIP B. TERRY, '13

SPAULDING-MOSS COMPANY

"Reproduction Specialists"

Blue Prints Photostat Prints Planograph Prints

BOSTON

LIBerty 3000

EMERY, BOOTH, VARNEY & TOWNSEND

EMERY, BOOTH, VARNEY & HOLCOMBE

PATENT LAWYERS

THOMAS B. BOOTH, '95 AMASA M. HOLCOMBE, '04

JOSEPH Y. HOUGHTON, '26

Boston

Washington

Square Holes: Square Pegs

The facilities of the Placement Bureau are being used by a steadily increasing number of employers who desire complete and impartial reports on Technology graduates qualified to meet their specific requirements.

Here are some of the openings the Placement Bureau was called on to fill between September 22nd and October 1st.

- Opening* 3072 PHYSICAL CHEMIST. Man trained in physical chemistry — capable of reading technical German — exceptional knowledge of crystal structure. Work to involve fundamental research in one of the newer fields.
- 3074 EXECUTIVE. Man to become head of an Industrial Engineering Department — national concern with fifteen plants. Must have good scholastic record — excellent personality — mechanical-chemical engineering background — two years' production experience — five years' experience with industrial engineering organization.
- 3075 INDUSTRIAL ENGINEER. Man to take charge of production planning and product control in manufacturing plant — demonstrated executive ability — experience in metal working and machinery manufacturing.
- 3081 RESEARCH METALLURGIST. Doctor's degree — outstanding research ability — practical viewpoint — to follow development work.
- 3090 RECENT GRADUATE. Design ability — new ideas — development work for large electrical firm that is expanding along new lines.
- 3097 RECENT GRADUATE. Chemical engineering — to study furnace operation — high ranking student — hard worker.

It is the policy of the Placement Bureau to make selections from the entire available list and recommend only those properly qualified for each opening. Many of the requests for men are confidential and specify that the recommendations be made without the knowledge of the nominees.

Inquiries regarding this service should be addressed to the

**PLACEMENT BUREAU
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASS.**

TECHNOLOGY MEN IN ACTION

CHECK-LIST OF THE ACTIVITIES AND ACHIEVEMENTS OF M.I.T. ALUMNI, OFFICERS, AND STUDENTS

A.P.H.A.

At the annual meeting of the Public Health Association in September the following Technology men were elected to office: SAMUEL C. Prescott '94, Chairman of Food and Drugs Section; CHARLES G. HYDE '96, President of Delta Omega, the honorary Public Health Fraternity; WALTER H. BROWN '15, President-Elect of the Association. As is their custom, the Tech men attending the meeting held a breakfast at The Maryland Hotel in Pasadena, at which were present: CHARLES G. HYDE '96, CHARLES E. A. WINSLOW '98, RALPH E. TARBETT '05, CHARLES A. HOLMQUIST '06, Mr. and Mrs. RALPH E. IRWIN '09, JOHN H. O'NEILL '10, CARL E. BUCK '15, AIMÉ COUSINEAU '16, PAUL F. NICHOLS '17, CLAIR E. TURNER '17, ALFRED H. FLETCHER '21, CLARA F. SMYTH '27, FREDERICK C. ROBERTS, Jr. '32.

"Proven Brilliance"

In the "Gossip of the Town" column of the Boston Post, the following appeared concerning the Edison scholarship winners and runners-up: "What has become of the scholars Thomas A. Edison sent to Tech? All have received their degrees except Gordon Burns, who is this year completing a five-year course. Everyone of them has lived up to expectations. WILBUR B. HUSTON ('33) is assistant to THEODORE EDISON ('23), son of the late wizard, at the Edison Labs in East Orange, N. J. IVAN A. GETTING ('33) is studying at Oxford, thereby enjoying the distinction of being the only man in the world to win an Edison and a Rhodes scholarship. WALTER WRIGLEY ('34) of Haverhill, only Massachusetts boy to win an Edison award, is now connected with a Bay State engineering firm. ARTHUR O. WILLIAMS, Jr. ('34), of Providence, is post-graduating in physics at Brown.

"There is another brilliant Tech man who worked his way through the Institute and established such marvelous scholastic records that his friends urged him to try for a Rhodes scholarship. In a spirit of fun he did and won it. Word now comes from England that he has become such a star in bacteriology, Oxford wishes

to retain him as a professor, which is the reason that MORRIS SHAFFER ('30) is the toast of his neighborhood."

Congratulations

To ALBERT SAUVEUR '89, Gordon McKay Professor of Mining and Metallurgy at Harvard, on receiving the new medal of the American Society for Metals. In tribute to Dr. Sauveur, the medal will be known as the Albert Sauveur achievement medal and will be awarded annually in recognition of metallurgical achievement which has stimulated work along similar lines and contributed to advance in metallurgical knowledge.

In the News

NATHANAEL G. HERRESHOFF '70, as one of the nation's greatest shipbuilders. He has designed six of the America's Cup defenders: the *Vigilant*, the *Defender*, the *Columbia*, the *Constitution*, the *Reliance*, and the *Resolute*. He is 86 years old and last year designed a boat which "sailed faster than anything under canvas in the recorded history of man . . . 20 miles an hour."

ALLAN W. ROWE '01, as one of the trustees of Norwich University.

DEXTER A. TUTEIN '17, on his appointment as representative of the \$1,500,000,000 retail solid fuel trade, NRA General Code Authority.

Written

About FRANCIS R. WHELTON '21, a book by Hervey Allen, "Toward the Flame," which gives an account of his brilliant War record.

By ARTHUR A. JACKMAN '33, a paper on "The Nature of the Bond in Bronze Welding," in the *Journal of the American Welding Society* for July.

DEATHS

ARTHUR G. WELLMAN '80, on August 31.

DAVID W. FRENCH '81, on August 9.

FRED B. JUDKINS '82, on September 13.

JOSEPH D. PLUMB '83, on August 28. Mr. Plumb was one of the first to write real estate advertising copy, and was a former director of a real estate course in the Extension Department of Columbia University. He was born in Boston 73 years ago, a son of the late Rev. Albert Hale Plumb and a descendant of the tenth generation of William Bradford, one-time Governor of Massachusetts. Before entering the real estate advertising business, he studied portraiture and illustration in Paris. Mr. Plumb's first real estate copy was written for the Boston firm of Wood Harmon and Company, one of the first firms to develop suburban realty for residential purposes. Later he moved to White Plains, N. Y., taking charge of the real estate advertising which was largely instrumental in the development of Gedney Farms, Yorktown, and other Westchester County projects. He had lived in New York City for the last ten years, writing extensively and serving as consultant to real estate firms. He had been engaged in research for New York University for two years.

JOHN L. SHORTALL '87, on September 9. Mr. Shortall, 69 years old, lawyer, and former President of the Illinois Humane Society, was born in Chicago in 1865, the son of John G. Shortall, philanthropist, educator, and also a former Humane Society President. Mr. Shortall was graduated from St. Paul's School, Concord, N. H., and the M.I.T. He and Charles E. Murison entered the investment banking business at Lake Preston, S. D., where Mr. Shortall studied law. In 1891 he was admitted to the Illinois bar and the two formed a law partnership. From 1906 to 1918 and again in 1924-1925, he headed the Humane Society and devoted a great part of his time to the welfare of children and animals. During the War he served as chairman of the local board of exemption. He married the former Mary Carter of Boston, and is survived by her and four children. — Mr. Shortall was one of the founders of the Northwestern Association of the M.I.T., organized in January, 1887, changed in 1921 to The Technology Club of Chicago.

THOMAS R. KIMBALL '89, on September 7. The following editorial appeared in an Omaha newspaper: "In the death of Thomas R. Kimball, Omaha has lost a justly famous citizen. He was an artist; an artist with the brush for spare time amusement, an artist with brick and stone, steel and concrete, for his permanent gift to his community. As monuments to his art stand the buildings in Omaha that he, as an architect, first dreamed and then designed: the city library, among his earlier works; the Fontenelle Hotel, the *World-Herald* building, St. Cecilia's Cathedral, and that other lovely structure which has been built over into less pleasing lines, the Burlington station.

"The variety of these structures, together with the charming homes he built in Omaha, and the beauty of the buildings of the Trans-Mississippi exposition, for which he was chief architect, showed the depth and sympathy of his imagination. This was further proven by one of his great services to the state, his work as adviser to the Nebraska capitol commission. He had no small part to play in defining the terms for the capitol competition that led to the selection of Goodhue as the capitol architect. The result is a state house without a peer in all the world. . . . Such men add color and flavor to the life of their community. Mr. Kimball added also beauty and culture. He gave much to his city and state."

CALVIN W. RICE '90, distinguished mechanical engineer, for 28 years Secretary of the A.S.M.E., and member of the Institute's Corporation since 1929, on October 2. A more extended account of Mr. Rice's achievements will appear in a future issue.

HOWARD L. ROGERS '93, formerly Vice-President and Director of Stone and Webster, on September 20. (See class notes for account.)

EDWARD L. WINGATE '93, on September 2. (Account in class notes.)

ALLEN C. JONES '95, on April 23.

HARRY C. WHORF '95, on September 22. (See class notes for account.)

JOHN M. PERKINS '00, on August 10.

CHARLES B. HAMILTON '07, on March 6.

HOWARD E. BATSFORD '08, on July 12.

CHARLES H. BREEN '12, on January 26.

JULIUS C. ARANA '25, on February 27.

ROBERT T. WILSON '28, in March.

LAURENCE PODVIN '30, on May 31.

COMPARATIVE SCHOLASTIC STANDINGS OF UNDERGRADUATE ACTIVITY, DORMITORY, AND FRATERNITY GROUPS

(Based on June 1934 Ratings)

	Average	Increase Over June, 1933	Corresponding Rank in June, 1933
1. Tau Beta Pi.....	4.11	*0.16	1
2. Combined Musical Clubs Management...	4.06	0.737	23
3. <i>The Tech</i> Management.....	3.82	0.115	5
4. Alpha Chi Sigma.....	3.815	*0.066	2
5. T. E. N. Staff.....	3.56	0.048	11
6. Institute Committee.....	3.553	0.036	10
7. Chi Phi.....	3.55	0.12	16
8. Alpha Kappa Phi.....	3.54	**	..
9. Officers and Representatives, Combined Professional Societies.....	3.53	*0.124	6
10. Phi Mu Delta.....	3.52	..	25
11. Varsity Sports Captains.....	3.49	*0.28	7
Average of 670 men in 25 activity groups..	3.48	0.06	..
Average of 168 men holding managerial and executive positions in activities.....	3.476	0.145	..
12. <i>Technique</i> Management.....	3.47	0.469	44
13. Wearers of the "T".....	3.456	*0.103	8
14. { T. E. N. Management.....	3.454	0.473	45
Combined Musical Performers.....	3.454	0.129	14
Average of 186 men engaged in publication activities.....	3.445	*0.097	..
15. Beta Theta Pi.....	3.44	0.02	17
16. Officers of the M. I. T. A. A.....	3.43	*0.445	3
17. Tech Show Staff.....	3.42	0.188	30
18. <i>Technique</i> Staff.....	3.41	0.017	19
Average of 226 men engaged in athletic activities.....	3.406	0.061	..
19. { Dormitory Committee.....	3.39	0.086	24
Phi Delta Theta.....	3.39	0.25	34
20. <i>Voo Doo</i> Management.....	3.38	*0.028	18
Average of 250 men on staffs of activities but not holding managerial or executive posi- tions.....	3.38	*0.025	..
21. <i>Benchmark</i> Management.....	3.375	*0.147	9
Average of 94 men engaged in dramatic and musical activities.....	3.366	*0.001	..
Average of all dormitory residents.....	3.36	0.02	..
22. Wearers of Varsity Athletic Insignia other than the "T".....	3.358	0.061	26
23. Delta Upsilon.....	3.35	0.38	47
Average of all undergraduates.....	3.34	0.06	..
24. Phi Kappa Sigma.....	3.318	*0.032	21
25. Sigma Chi.....	3.313	0.206	36
26. Kappa Sigma.....	3.31	*0.05	20
27. Varsity Sports Managers.....	3.298	0.404	48
28. <i>The Tech</i> Staff.....	3.279	0.065	31
29. Tech Show cast, chorus, and orchestra...	3.277	*0.054	22
30. T. C. A. Cabinet.....	3.272	*0.002	27
31. <i>Voo Doo</i> Staff.....	3.25	*0.20	13
32. Delta Psi.....	3.24	0.56	50
Average of 593 members of the 25 social fraternities (Does not include Tau Beta Pi and Alpha Chi Sigma).....	3.23	0.09	..
33. Sigma Alpha Epsilon.....	3.22	0.18	39
34. Theta Delta Chi.....	3.212	0.052	32
35. Phi Sigma Kappa.....	3.209	*0.031	29
36. Phi Kappa.....	3.20	0.68	51
37. Phi Beta Delta.....	3.196	*0.634	4
38. Sigma Nu.....	3.194	0.254	46
39. Phi Gamma Delta.....	3.187	*0.073	28
40. Delta Tau Delta.....	3.165	0.055	35
41. Theta Chi.....	3.156	0.006	33
42. Phi Beta Epsilon.....	3.14	0.115	41
43. Sigma Alpha Mu.....	3.12	0.06	38
44. Tech Show Management.....	3.11	0.072	40
45. Delta Kappa Epsilon.....	2.99	0.13	49
46. Theta Xi.....	2.98	*0.043	42
47. Lambda Chi Alpha.....	2.86	*0.62	12
48. Alpha Tau Omega.....	2.84	*0.24	37

* Decrease

** Not ranked

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

The Technology Club of Hartford

Our annual outing in conjunction with the New Haven County Technology Club was held at the Boxwood Manor, Old Lyme, Conn., on the last day of June as usual, and as usual there was no rain that day.

Those who went down to play ball before dinner found a cellar dug in the diamond, and repaired to a nearby field. The Hartford contingent, living as they do nearer the soil than their richer neighbors from New Haven and Waterbury, were able to cope with the primitive conditions and trounced their helpless opponents by the overwhelming score of 8 to 7.

At dinner at the Boxwood we found plenty to eat and held our meeting. The officers for the coming year were to be inducted at this meeting, but the Secretary forgot to bring it about. Anyway, they always have to be inducted before nomination, so why bother them further? They are: President, Charles H. Chatfield '14; Vice-President, Stanley H. Osborn '15; Secretary-Treasurer, Thomas D. Green '26; Governors: Roger W. Wight '01 and Harold G. Donovan '24.

At this meeting it was announced that Charles E. Smith '00 had been elected President of the Alumni Association, so when we had calmed down sufficiently to act with coordination, we gave him the long cheer with a yell that terrified wild life for miles around. Mr. Smith replied with a short and charmingly modest speech, pointing out the part played by local clubs in the Alumni Association, and showing the close relations existing between the alumni and the Institute.

Our meetings the past year were saddened because a favorite face was missing, and it was feared that this face's marriage had lost him to us forever. Accordingly, it seemed only fitting that the trophy donated for the annual baseball victory should be named the John H. Coyle ('20) Memorial Trophy, and with suitable ceremony this trophy was produced at our meeting and duly presented to the Hartford Club for its demonstrated prowess on the diamond.

This splendid and imposing prize was donated anonymously as an annual award to be held by the club drawing high score in our yearly baseball game. It is a handsome water pitcher, done in the modern manner in aluminum with a small escutcheon neatly worked on the side, and will be held proudly by the winners of all games to come. It holds a quart and weighs two ounces, and was obtained by negotiation with a well-known supplier of such articles as may be had for five or ten cents. In connection with this affair

we are particularly happy to report that Jack Coyle actually did show up at the outing, which cheered us all up.

Following dinner everyone repaired to the tennis courts or golf course to take part in the afternoon's competitions. The results of these struggles are tabulated below in the interest of science: Tennis — Marshall S. Wellington '16 and J. P. F. Pilkington '27, playing for New Haven, defeated E. C. Wheeler '26 and E. C. Alden '95, playing for Hartford, by 6-2, 7-5. Golf — Match between Hartford and New Haven Clubs — Waterman and K. M. Lane '17, for Hartford, defeated C. E. Smith '00 and Laurson '10, for New Haven, 3-0. E. O. Hiller '04 and G. L. Mylchreest '10, for Hartford, defeated H. G. Manning '12 and T. C. Merriman '09, for New Haven, by 2-1. H. B. Hastings '07 and Perry, for New Haven, defeated W. S. Wise '23 and J. H. Coyle '20 by 3-0. Net Score: Hartford 5, New Haven 4.

Individual Prizes were awarded as follows: Lowest number of putts — T. C. Merriman '09, of New Haven, with 29 putts. Merriman also drove nearest the first hole, but sacrificed that prize to take this one. Drive nearest the first hole — E. O. Hiller '04. Hiller also had low gross score with 84, but sacrificed that prize to take this one. Low Gross — H. G. Manning with 87. T. C. Merriman also had 87. Kickers Handicap — Divided on a tie of 72 strokes between Waterman of New Haven and J. H. Coyle of Hartford. — THOMAS D. GREEN '26, Secretary, 137 Ballard Drive, West Hartford, Conn.

Technology Club of Panama

A farewell party was given by the entire gold personnel of the Balboa Mechanical Division in honor of their retiring superintendent, Captain R. W. Ryden '07, on which occasion he was presented with a handsome silver tea tray and a watch on which was engraved: "Presented to Captain R. W. Ryden, retiring superintendent, by the men of the Mechanical Division as a token of esteem and affection, June 30, 1934."

The new superintendent, Lt. Commander Charles F. Osborn '20, was introduced to the employees. Osborn was formerly on duty in Washington, D. C., as a member of the Bureau of Construction and Repair of the U. S. Navy. Captain Ryden will go to Washington, D. C., where he is under orders to the Industrial College. Before leaving for the States, Captain Ryden was crowned champion of Fort Amador Golf Club.

Major Holland L. Robb '21 (11th Engineers, Corozal) and family sailed the end of June for a two months' vacation in Costa Rica. — Colonel Richard Donovan '21, Coast Artillery Corps, sailed the

second of July from Cristobal to his new station, the 69th Coast Artillery, Fort McClellan, Ala. — L. B. Moore '26, assistant to the Office Engineer, the Panama Canal, is on an extended vacation in the States. The following clipping concerns Lewis Moore's brother: "Frank E. Moore, Jr., '24, son of Mr. and Mrs. Frank E. Moore of Balboa, was married July 25 in Washington, D. C., to Mrs. Taylor Matthias of Evanston, Ill. Mr. and Mrs. Moore are making their home in Washington."

Major W. E. R. Covell '23, Assistant Engineer of Maintenance, Panama Canal, sailed July 1 for a vacation in the States and returned August 22. — I. F. McIlhenny '23 started work with the Madden Dam on the 13th of June this year as assistant engineer. — Last year we predicted that R. T. Cowdrey '23 would eventually become a great fisherman. He certainly has "and then some," as you may readily gather when you read that he caught the "largest fish ever landed in Panama — a 15-foot, four-inch, 1,008-pound sawfish," according to the newspaper story, and "it sets an all-time record for local catches, offering Panama fishermen a mark to shoot at for some time to come." Lieutenant Cowdrey is given credit for catching the fish despite the fact that he did not use the customary rod and reel but a huge moving crane.

On the 17th of July an earthquake rocked the cities of David and Puerto Armuelles in the province of Chiriqui, Panama, about 300 miles from here. The shocks continued for several days; many were felt on the Canal Zone, with about 40 tremors being registered on the seismograph at Balboa Heights. The damage has been roughly estimated at half a million dollars.

Postal officials at Balboa Heights placed on sale August 15 a new three-cent stamp in commemoration of the 20th anniversary of the opening of the Canal to commercial traffic. The design of the new stamp, to be known as the Goethals memorial stamp, was executed by the Secretary, who is an architect in the Canal Zone. — MEADE BOLTON '16, Secretary, Box 23, Balboa Heights, Canal Zone.

M.I.T. Club of Western Maine

On the second of September, the Club held an outing at Douglas Hill. In contrast with the events which have since taken place in Maine, it was a particularly calm and peaceful session on that same restful hilltop overlooking that wonderful view. The same genial hospitality, so characteristic of Dennie, prevailed, and the same bountiful dinner, which surpasses all description, was enjoyed by 11 Tech men and their guests, a company of 30 in all.

At its conclusion, President Compton, our guest of honor, told us of some of the changes that were being made in the instructing staff of the Institute, and of the other various problems facing Technology these troublesome days, and then the company adjourned for golf, shuffleboard, or small talk on the veranda, where Mrs. Denison served tea. — ALFRED E. B. HALL '15, *Secretary*, 94 Beach Street, Saco, Maine.

The M.I.T. Club of Western Pennsylvania

The activities of the Club during the summer were confined to the weekly informal luncheons, held every Friday at the Union Grill, 440 Diamond Street, Pittsburgh. Public officials and corporation executives miss a lot by not being present to hear the problems of the country settled. Those contributing to the discussion were J. T. Nichols '22, Malcolm G. Davis '25, S. J. Helfman '24, Millard M. Greer '24, (to mention the club officers), and E. L. Chappelle '25, Howard Dexter '23, Francis Foote '15, George Ousler '16, Bill Ridge '25, and J. Clyde Whetzel '17.

We are looking forward to the usual season of enjoyable meetings. When you read this the first gun of the season will have opened up in the form of a (19th hole) golf match and dinner at the Field Club, Friday, September 28. Details of the schedule for the remainder of the year are not available, but local M.I.T. men may be sure they will be worth while. — E. J. CASSELMAN '15, *Assistant Secretary*, Mellon Institute, Pittsburgh, Pa.

CLASS NOTES

1888

Odin Roberts died July 22 at his summer home at Eastern Point, Gloucester. He was a member of our class during our junior and senior years and was one of our most prominent members, playing on our championship football team which defeated Dartmouth, Amherst, Williams, and the rest in '87.

The Boston *Transcript* of July 24 gives a very complete record of Roberts' life and activities from which we have taken the following: "Mr. Roberts was born in Boston in 1867, the son of the late George Litch and Hinda Barnes Roberts. He was a direct descendant of William Bradford, Peter Hobart, and Samuel Lincoln, early settlers of Massachusetts.

"Mr. Roberts attended Chauncy Hall School from 1875 to 1882, and graduated from Harvard in 1886, cum laude. He obtained an S.B. degree from M.I.T. in 1888, and graduated from Harvard Law School in 1891 with degrees of LL.B. and A.M. He was admitted to the Massachusetts bar in 1891, and entered the legal profession as partner of the late James H. Lange.

"Since 1925 he had been a member of the firm of Roberts, Cushman and Woodbury. He married Ada Mead, daughter of the late Sumner Rust and Ada Lawrence

Mead of Boston. Mr. Roberts was a member of the Puritan Club of Boston; the Union Club of Boston; the St. Botolph Club, of which he was President for four years; the Harvard Club of Boston; the Harvard Club of New York City; and until his resignation in 1931, of The Country Club, Brookline.

"In his youth Mr. Roberts had been an enthusiastic yachtsman and a member of the Eastern Yacht Club. He was interested in astronomy and astrophysics and was a founder and the first President of the Bond Astronomical Club. He was also a Fellow of the American Academy of Arts and Sciences, a member of the American Astronomical Society, the American Society of Mechanical Engineers, and the Rationalist Press Association of London.

"After his marriage in 1897, Mr. Roberts lived in Dedham until 1908, when he moved to Brookline. Since 1916 he had lived in Boston, his last home being at 32 Lime Street.

"Besides his widow, he leaves two sons, Frederick M. Roberts and Dr. Sumner M. Roberts, both of Boston; a daughter, Mrs. Philip Rhineland of New York; a brother, Harold Roberts of New York; and an aunt, Miss Jennie Roberts of Brookline.

"Genial, capable Odin Roberts is gone, and his departure leaves a void in an unusually wide circle of Bostonians who stood bound to him by human associations of friendship warm and firm. Though his high competence in the field of patent law is well known — a field whose tilling required great learning on his part in many branches of science — he will be remembered with especial appreciation for his leadership in the social life of men. A Bostonian of truly distinguished mental ability, wholesome ideals, and helpful way, Odin Roberts made himself ever welcome in life, and mourned at his farewell."

We also have to record the death of George L. Munn on August 13 at his home in Easthampton, Mass. Munn entered the Institute with our class as a freshman in the fall of '84 from Chicopee Falls, Mass., but remained only during our freshman year. Until '88 he was a designer of narrow elastic woven fabrics. From then until '05 he was Editor and Proprietor of The Easthampton News, Easthampton, Mass. In '05 he removed to Springfield and engaged in the advertising business as President of the Munn-Nichols Company. He remained in this line of business until he retired in '30. Munn was a genial fellow and his passing will be mourned by those of us who knew him during our freshman year.

Mrs. Naomi E. M. Collins of Chevy Chase, Md., bereaved wife of our late classmate Edward Collins, Jr., writes as follows: "My beloved husband was the finest and best gentleman that ever lived. Although he had been in very bad health since last summer, his passing was sudden, only being very ill a night and a day, and having been just out the day before, to take my sister and I for a drive. — I always enjoyed hearing him tell

about the M.I.T. and the Class of '88. — Thanking you for your very kind sympathy. . . ."

Walter C. Gage has moved from Holyoke, Mass., where he has been General Superintendent of the Worthington Pump and Machinery Corporation for the last 14 years, to 266 Fourth Avenue, East Orange, N. J.

Ben Buttolph inquires regarding our classmate Dr. Harold Gross, the blond member of the "Tug-of-War" team that pulled Harvard "off the cleats" March 5, 1887. Your Secretary thinks he still is a practising physician in Eureka, Calif., his old home, but will drop him a line and find out and report. Ben also mentions Billy Linzee, the brunette of the class, who graduated with '89 and has trained with them since.

Your Secretary has passed a very pleasant summer on Chebeague Island, Maine, where he runs a garden, a flivver, and a golf club (principally the latter), having been Secretary-Treasurer since he helped organize it 14 years ago. His principal accomplishments in a golfing way this summer have been to reach the semi-finals in both scratch and handicap championships, tie for second place in a scratch tournament having 30 players, break 80 twice, and make a "hole-in-one" for the second time on August 16, the first "break" of that kind occurring at Chestnut Hill on June 5, 1926. Now you other golfers "tell me one." — BERTRAND R. T. COLLINS, *Secretary*, Chebeague Island, Maine.

1890

At the annual meeting of the American Society of Civil Engineers, the following members of the class of '90 were in attendance: Fuller, Rice, Walker, and Sherman. The last man began the five-year term as a member of the Executive Committee of the Sanitary Engineering Division. He was also charged with the presentation of members to whom medals and prizes were awarded by the Society in 1933.

George W. Fuller, engineer of the Class of '90, a native of Franklin, and for two years head of the Lawrence Experimental Station of the Massachusetts Board of Health, passed away at the age of 65. Mr. Fuller was the engineer who gave the largest cities of the country pure water. He was educated at Tech and the University of Berlin.

Colonel Henry W. Waite, the deputy administrator, gave the encouraging word, after an 8,000-mile swing around the country, that most of the public works projects are ready to start as soon as weather permits. Colonel Waite is the engineer who passes on projects before they reach Secretary of the Interior Ickes. He was a railroad operator for many years. The war brought him into the A.E.F. and gave him his military title. He was chief engineer of the army transportation corps, and had duties of commanding importance in connection with the railroad construction and operations on the front and with the Army of Occupation.

1890 Continued

William H. Johnson called on the Secretary at Lexington. He will be remembered as the first President of the Class of '90. — William B. Poland's address is The Cosmos Club, Washington, D. C. — GEORGE L. GILMORE, *Secretary*, 57 Hancock Street, Lexington, Mass.

1891

So many events of vital interest are happening here in America at the present moment that we are apt to let them eclipse the picture Europe presents and the far-reaching consequences of another European War which is more real than the majority of Americans think, if indeed they think of such a possibility at all.

Charles G. Waitt has just returned for a few weeks' visit from five years spent in close observation in all the European countries. As a continental correspondent of the *London Times* and other newspapers, he gives his classmates a few impressions of current European conditions: "The question now asked there by all well-informed men is not if war will come, but how soon will it come and where will be the starting point. It is certain that when it does strike, it will strike with brutal suddenness, without notice or the usual diplomatic amenities that ordinarily precede war. Two years and more ago it was thought that the Polish Corridor would furnish the excuse for armed conflict between Germany and Poland. Now interest is centered on the Balkan States, particularly Austria, and it is there that the future war will probably find its starting point.

"It was the writer's fortune to be in Vienna the memorable day of July 25 when the abortive attempt was made by the Nazi to overthrow the Austrian Government, and when the much respected and beloved Chancellor Dollfuss was assassinated. A reign of terror followed in Vienna for two days before the Government finally had the situation under control. In the severe fighting in the streets between the Nazi and the loyal army, all the implements of regular warfare were used: tanks, light artillery, machine guns, and so on. Stone-cobbled streets were torn up for barricades by the Nazi which were in turn stormed. The writer witnessed fierce mass attacks; men falling under withering machine gun fire and left for hours where they fell; and he himself was caught between fierce cross fire on a street where only a friendly doorway into which he ducked saved his life. Eventually the Nazi forces were defeated and Vienna returned to its normal life, but it was fully two weeks before the Government forces had the situation in hand in the provinces and peace was restored.

"At the first outbreak on July 25, Italy promptly moved up four full army divisions to the Italian-Austrian frontier, and Poland and Czechoslovakia likewise moved men and artillery to their respective frontiers. Had the Nazi been successful in their attempt to seize power in Austria there would have been no question that this would have precipitated

armed intervention by Italy, Poland, and Czechoslovakia, which in turn would have spelled war, involving France and Germany also. When the writer left Praha, Czechoslovakia, late in August, the Nazi were openly boasting that another attempt would be made to seize the control of Austria before January 1, 1935, and that this time there would be no blundering. If such an attempt takes place, and it is highly probable that it will, no one can foresee the consequences. In that event war seems inevitable — a war in which all the principal European nations will probably become involved. So here is the danger spot of Europe at present.

"Let us leave this potential danger zone and look for a moment at the little Republic of Czechoslovakia lying due south of the German Empire. Here the people are friendly and welcome the traveler, particularly the American. They have reason to be especially friendly to Americans, for our former President Wilson, at the Treaty of Versailles, gave back to Czechoslovakia her former independence and she is now a thrifty, happy, young Republic.

"Praha, the capital city of Czechoslovakia is one of the most interesting cities of the old world. Formerly a terminus city where the caravans from the Far East ended their long trek and exchanged their oriental goods for Western products, it has always maintained its prestige and today is a place where the East meets the West. Its venerable 'Old Town' with its labyrinth of Gothic and Baroque spires and towers; the broad Vitava with its green islands and white, stone-girdled bridges; the churches and noble mansions of the Mala Strana (small town) encircled by wooded and grassy slopes and dominated by the Royal Castle and Cathedral of St. Vitus, make it difficult to find an equally impressive panorama anywhere else in the world.

"And 'over the mountains lies Karlsbad,' not too far away, however, for it is reached quickly and pleasantly by automobile. The way thither takes one through acres of fertile red soil devoted to hop culture and also through deep pine forests and along picturesque mountain trails. The landscape of Bohemia has all the fascination of the Alps combined with the peculiar charm of the Italian Lakes. We find Karlsbad, that Queen of Spas, lying deep in a narrow valley between the Bohemian hills. Its founder, Charles IV, King of Bohemia and Roman Emperor, gave permission for the place to be named after him, and on the advice of the Emperor's physician a small settlement was built around the hot spring in 1349. Since then it has become the most famous Spa of Europe for the actual healing powers of its unique hot springs. All the Czars of Russia, including the late Czar Nicholas, came regularly every year to receive the benefits of the mineral springs; much money was spent in building royal accommodations, and a magnificent Russian Church was constructed and is in use to this day.

"In sharp contrast with this pleasant Bohemian landscape is the sordid picture Russia presents to the observing traveler. If one joins an 'Intertourism' party for sightseeing in Russia, he is given a Russian interpreter on his arrival. This guide is careful to show the tourist only the most pleasing parts of the city and surrounding country and gives him a beautiful story of Russia's progress under the Five Year Plan — and the tourist returns with a totally false impression of Russia as she is today.

"To be sure, Russia is building new apartment houses and her factories are beginning to turn out a maximum output, but the new apartment houses are all occupied by Government officials and the inefficiency in the factories is appalling. One has but to scratch below the surface to see in the lodging houses of the working people tier upon tier of narrow shelves, barely wide enough to allow a man to lie on, and on these narrow, bare boards men and women sleep promiscuously with nothing but a thin blanket to keep out the cold. Such squalid, miserable quarters are the rule. For sanitary reasons alone they would not be tolerated in any city in the world outside of Russia. In some of the more modern 'flats' of five rooms each, five families totalling 12 to 20 people are living, each family using the common kitchen, and so on.

"When the traveler changes his U. S. dollar at the Government Bank, he receives one rouble for his dollar. That is the official rate at all Russian banks. However, if he is wise enough to change his U. S. money at any store or outside mercantile house, he receives 40 roubles for his dollar (so anxious are the merchants to get any foreign money that has real value) but should the transaction come to the attention of the G.P.U. — off to Siberia you go. And how little a rouble will actually buy in the stores: two ounces of butter, three medium sized turnips, one-eighth pound of coffee if the customer is fortunate enough to find a store that has coffee, for coffee is very, very scarce.

"All this misery is borne cheerfully by the younger generation, for they are looking forward to the domination of the World by Russia in the near future. The older generation, however, can see through all the propaganda and do not take kindly to all the hardships and privations that even they, poor as they have been before, are now obliged to bear. And with a short grain crop due to last summer's lack of rain, Russia looks forward to further hardships this coming winter. The people are hungry now and by winter there will surely be a severe famine.

"It is well known that in times of great economic distress the moral code of any nation relaxes and Russia is no exception. The Russian railway system is practically the same as in all other European countries. For instance, the traveler buys his sleeping car accommodation at Leningrad for his journey to Moscow and this entitles him to a berth in a private compartment containing one other

1891 Continued

berth and private toilet arrangements. At the next station his door is opened by the conductor and a young Russian woman is given the other berth in your compartment which she has purchased. The porter brings in her baggage and bids her good night. She gives her male traveling companion a pleasant salutation and proceeds to disrobe and make her toilet with no more concern than if she were quite alone in her own bedroom, all being taken as a matter of course; in fact it is the usual thing on all Russian Railways. Tickets are sold with absolutely no regard to sex and are thus accepted by all travelers.

"Should time and space permit, the writer would enjoy reciting further personal experiences; a bear hunt in the high Tatra mountains on the Polish frontier where the huge Russian bears abound; experiences with packs of wolves and wild boar in a truly wild and primeval country; but this must wait until another time and perhaps when I return again to America I will have something more of interest. We are in the midst of rapid changes and world events of great importance are taking place."

Mr. and Mrs. Frederic H. Fay announce the marriage of their daughter, Eleanor Potter, to Mr. Wentworth Kennard on September 7, 1934. Mrs. Kennard was graduated from Vassar College in 1931 and subsequently took graduate work at Radcliffe College. Mr. Kennard is a graduate of the Harvard Engineering School and is an assistant to Professor Comfort Adams of that institution. Mr. and Mrs. Kennard reside at 19 Shepard Street, Cambridge.

William Stuart Forbes, Jr., son of our Class President, and the former Mrs. Katherin Greeley Brown, daughter of the late Mr. and Mrs. Norman Frost Greeley, were married July 27, 1934, at the bride's summer home in Beverly, Mass. Mrs. Lynn Nowell of Chestnut Hill was the bride's only attendant. Mr. Forbes had William H. Vanderbilt of New York and Newport as his best man.

The Dover Point Bridge, built by the State of New Hampshire, was dedicated on September 6, 1934. Charles M. Spofford, representing the engineers, Fay, Spofford and Thorndike, made the presentation speech. The Bridge was accepted on behalf of the State by Governor John G. Winant. The new bridge replaces the old wooden toll bridge of the Boston and Maine Railroad across Little Bay, and is a link in the east side route via Portsmouth and Dover to the White Mountains as well as in the cross-state route, U. S. 4, from Portsmouth to and beyond Concord, N. H.

John Cameron Abbot, a prominent woolen manufacturer of Westford and Lowell, Mass., died at a Boston Hospital June 14, 1934, at the age of 62 years. Born in Westford, the son of John W. and Elizabeth Southwick Abbot, he attended the Worcester Polytechnic Institute for a time, then came to M.I.T. as a member of the class in the electrical engineering course. Upon leaving Tech he became

associated with his father's firm, the Abbot Worsted Company at its Graniteville (Westford) plant. In 1900 he became agent, and in 1912 Treasurer and General Manager, of the company. In 1898 he married Miss Anna M. Fletcher and they have two sons, John Fletcher and Robert Fletcher. All his life he made Westford his home.

Patrick Maurice Lynch died at his home in Holyoke, Mass., August 6, 1934, in his 65th year. His entire business life was spent in his native city of Holyoke where, for a time, he practiced as a civil engineer and architect and since 1902 was in general contracting work as a member of Lynch Brothers Brick Company, of which he was Treasurer. In 1913 he married Miss Esther M. Sears. Both Mr. and Mrs. Lynch will be recalled particularly by those who attended the Thirtieth Reunion at Wianno in 1923.

Howard Lewis Rogers, formerly a partner of Stone and Webster, died at his home in Chestnut Hill, Mass., September 20, 1934, after a long illness. The immediate cause of his death was an acute attack of influenza. He was born in Newton, September 7, 1871, where he was educated in the local schools. He entered Tech with the class in 1889 and enrolled in the electrical engineering course. Following their sophomore year Howard Rogers and his classmate, Laurence J. Webster, brother of Edwin S. Webster, spent the summer of 1891 in gaining practical experience in the drafting room of Stone and Webster. At that time the firm had been going for about two years and the office force, consisting of five persons, occupied three rooms at No. 4 Post Office Square. This temporary summer job developed into a permanent position and Rogers continued his connection with Stone and Webster until, at the time of his retirement in 1929, he was Vice President and Director of the Corporation which succeeded the former partnership. He was active in military affairs, having been, at one time, Captain of Battery A, Field Artillery, M.V.M., and later Lieutenant Colonel of Field Artillery, M.N.G. He was a founder, Trustee, and Treasurer of the Beaver Country Day School to which he devoted much constructive effort; he had been a Director of the Society of Arts and Crafts, and Chairman of the Standing Committee of the First Church in Chestnut Hill (Unitarian). He was a member of The Country Club and had formerly belonged to the Union, Algonquin, Exchange, Eastern and Corinthian Yacht, and the Longwood Cricket Clubs. In 1907 occurred his marriage to Clara Hunt Phillips, of Brooklyn, New York. He is survived by his wife and by five children: Mrs. Allan L. Chickering, Jr., of San Francisco, Mrs. Mark Hopkins of Dover, Thomas Nickerson Rogers, John Gardner Rogers, and Miss Mary Virtue Rogers of Chestnut Hill; four grandchildren, a brother, Gardner Rogers of Brookline, and three sisters, Mrs. Laurence J. Webster of Holderness, N. H., Mrs. Laning C. Holden of New York, and Mrs. Alexander Henderson of Chestnut Hill.

Edward Lawrence Wingate died at his home, 85 Dexter Street, Malden, on September 2, 1934, after a brief illness. Born in Newport, R. I., February 15, 1872, his family moved to Malden during his boyhood and there he was graduated from the Malden High School prior to entering M.I.T. to take mechanical engineering with the class. For the first three years after leaving the Institute he was employed by the City Engineer of Malden. From 1896 to 1915 he was with the G. W. and F. Smith Iron Company, manufacturers of structural and architectural iron, as foreman of machine shop and superintendent of works. In 1915 he became general manager of the Boston Storage Warehouse Company, which position he held until his death. He had long been active in military affairs, was a former member of the First Corps of Cadets, and a member of the Loyal Legion. He was married in 1902 to Abbie Copeland Corbett and is survived by his widow and two children, George Edwin (M.I.T. 1926), and Edward Lawrence, Junior.

Changes of Address: Harry L. Clapp, 135 South LaSalle Street, Room 2157, Chicago, Ill.; George Guppy, Office of the Supervising Architect, Treasury Department, Washington, D. C.; Charles W. Taintor, 10 Nassau Street, Princeton, N. J.; John S. White, Whitehall Acres, Post Office Box 36, Alamo, Calif. — FREDERIC H. FAY, *Secretary*, 44 School Street, Boston, Mass. GEORGE B. GLIDDEN, *Assistant Secretary*, 551 Tremont Street, Boston, Mass.

1894

Vacation over and the Institute again in full swing, the Secretary is back on the job, trying to pick up the loose threads and to carry on the work of his various offices. It was a grand vacation with very pleasant contacts and the renewal of friendships made in earlier years, but it is even better to be back, and once more have students about, and receive the calls of visiting classmates and old friends.

The last batch of notes failed to give the news in regard to Harry Gardner. Just at the time of our reunion he was suddenly taken ill with what proved to be a severe attack of gallstones. After an x-ray examination it was decided that operation was at once necessary and about the middle of June he went into the hospital for this delicate attention. I am happy to say that he was able to leave for his summer home in New Hampshire early in July and has made a splendid recovery and is now back at his post as Professor of Architecture here at the Institute. We shall all hope that he will have no further trouble and that he will be able to carry on his work without interruptions of this sort until the time comes for his retirement.

The papers a few days ago carried an interesting account of some things which Abbot has been doing in California during the summer. These included the description of weird installations on the roof of his house so that solar heat could

1894 Continued

be used, not only for the heating of water but also for cooking purposes. No doubt many members of the class saw the Associated Press dispatch which covered this interesting work.

During my absence I received from the Alumni Office notice of a new address for Professor Henry B. Dates of the Case School of Applied Science. This address is 3091 Euclid Heights Boulevard, Cleveland, Ohio. Any of the '94 crowd who happen to be visiting Cleveland will probably find it enjoyable to make contact with him. Since leaving the Institute, Dates has had a most interesting and varied career, including a number of years' special service in the engineering field with some of the large electrical companies, but for a number of years past he has been the Professor of Electrical Engineering at the Case School. Here he has conducted a not inconsiderable amount of research and has rendered valuable public service in connection with studies which have been made in Cleveland.

This batch of notes is necessarily limited because of the short time in which the Secretary has been back at his desk. He would extend most earnestly the annual invitation to all members of the class to supply him with data which can be used in making our class notes of particular interest. The reaction from our class reunion, which has been perhaps most persistent, shows the appreciation of the extent to which all the members present were interested to know what other men in the class were doing, both professionally and otherwise. Send in the items. — S. C. PRESCOTT, *Secretary*, Room 10-405 M.I.T., Cambridge, Mass.

1895

The evolution of time changes the complexion of our class membership. We hesitate to acknowledge the passing of years but are reluctantly forced to do so when we record the recent deaths of two of our mates.

James Russell Wells. After graduation at the Institute he entered the firm of Flagg and Wrenock, in Boston. While visiting his home in Quincy, Ill., he was persuaded to enter the firm of Wells and Adams, operators of Farm Loans. In 1898 he married Henrietta Rosamond Eaton, of Kenosha, Wis., and a son and four daughters composed the family circle. During the year 1914 Wells, with two friends, toured Europe, and were in England when the last war was declared. He was interested in art, music, and literature. His club connections covered membership in the Kiwanis (at one time its President), the Country Club and the Spring Lake Association, both of Quincy. He was also a member of the Delta Upsilon Fraternity.

His interest in literature was evidenced by his large and very fine library and he wrote some beautiful poems. Photography was his special hobby which was exercised most extensively, producing many beautiful and artistic pictures. During 1932 he suffered an attack of coronary thrombosis from which he

recovered, but during the fall of 1933 he began to fail, and passed away on Wednesday, January 17, 1934.

Harry Church Whorf. Harry was an artist, designer, and pageant director of national prominence, and the father of John Whorf, one of America's most brilliant water color artists. He died at his home, 94 Samoset Avenue, Winthrop, Mass., on Saturday, September 22, following a long illness. He was in his 61st year. Another son is Richard Whorf, noted actor, who carried out the old tradition of the stage that the show must go on by playing at the Plymouth Theater in Boston on the night of his father's death, where he played the leading rôle in "Coming Spring." Funeral services were held at his home and burial was at the Winthrop cemetery.

Mrs. Sarah Lee Whorf and another son, Benjamin Whorf '18, also survive him. Harry was a native of Wellfleet, Mass., the son of Isaiah and Thannie Whorf, and at the age of five he became a resident of Winthrop, where he has always made his home. He was educated in the public schools and graduated from the Institute with the Class of 1895. For many years he was in business for himself as a designer, but during recent years he was associated with the concern of Edward Hare and Company, commercial engineers of Boston. He was well known as a lecturer, and had written many plays, the majority of which he staged and directed himself, mostly for charitable purposes.

He won considerable fame during the World War when he put on many pageants, most of these for the benefit of the American Red Cross. In one pageant which he directed there was a cast of 900 people. Harry was always interested in civic and welfare organizations, and was a notable person throughout his entire life, developing a family of notables to carry on. Those of our class who attended our Thirty-Fifth Reunion will remember the interesting illustrated lecture Harry gave us on the "Historic Land-Marks of Boston Harbor."

Mr. and Mrs. Arthur L. Canfield, of Somerville, N. J., announce the marriage of their daughter, Louise, to Mr. Walton M. Wheeler, Jr., on Saturday September 1, 1934, at Winnetka, Ill. — Alfred P. Sloan, Jr., President of General Motors Corporation, one of the most active of our class among America's outstanding business executives, gave a most timely luncheon talk at the Boston Chamber of Commerce, on April 26 last. — Alfred Zapf, of Orange, Calif., was ill for some time during the spring of this year, but we have advice that he has again reached normalcy and is wearing his good-natured smile.

Captain Herman Kotzchmar, Jr., for a long time one of our Western boys, at Seattle, Wash., has transferred his sea-interests from the Pacific to the Atlantic, and can now be found with the U. S. Coast Guard, 1401 Customs House, Boston, Mass. Herman always liked the water. Drop in when you come to Boston, he will be glad to renew old friendships.

At the Annual Meeting of the American Geophysical Union, held during April, 1934, our Gerard H. Matthes, Captain Auxiliary Reserve and Principal Engineer U. S. War Department, read a most interesting paper on "Floods and Their Economic Importance." The subject: the complex problems of flood control; the causes and effects, both beneficial and otherwise, of floods; results of river development; the uses of reservoirs and canals; and numerous other items which demand the attention of a military engineer. Gerard Matthes at present is living in Vicksburg, Miss. For those who are interested in the details of his article, a reprint may be obtained from Matthes or *The Military Engineer*, July-August, 1934, issue.

You may not believe it, but the Class of '95 has a member whose inventive genius has been a blessing to the thousand motorists who ply the streets and highways of the nation, Lieutenant Albert Geiger, Jr. Technology created and Boston adopted the First White Safety Traffic Lines. The following is taken from the *Boston Globe* of August 19 last. "The white safety line for traffic was first used during the Boston police strike in 1919. State highway officials had no knowledge of its being used previously."

"It was through a story in the motor columns of the *Globe* that the facts came out. Lieutenant Geiger and some of his friends read it. While he was modestly holding back, they insisted that he tell the story. When the police strike began, President Coolidge, then Governor of Massachusetts, ordered out the militia. Mr. Geiger was first lieutenant and signal officer, a member of the late Colonel Decrow's staff in the first Motor Corps which had charge of traffic. In the early days it was difficult to keep traffic moving. Having had a technical training at M.I.T., Lieutenant Geiger realized that traffic lanes would be a help. Out of that thought came the idea of the white safety line and also stop lines. He presented it to his commanding officer and it was approved. He also planned the white belts across the chests and backs of men doing traffic duty; also the first flood light shining on a traffic officer, which was placed at the junction of Boylston and Tremont Streets, Boston." Geiger's home is now in Duxbury, Mass.

The questionnaire for the next reunion is forthcoming soon. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, 420 Lexington Avenue, New York, N. Y.

1896

Billy Anderson spent the greater part of the summer at Biddeford Pool, Maine, in accordance with his usual custom. In nosing around Portland he ran across the name of William H. Clifford in the Directory and the similarity of names aroused his curiosity, so that he made a call on the gentleman and learned that he was a nephew of our '96 Billy Clifford, who has been in Virginia for a long time. Anderson planned to stay over in Portland for a

1896 Continued

month or more after closing up his house in Biddeford Pool the last of September.

The only recent news from Jacobs came through Professor Doten of the Economics Department of Technology, who reported that he and Jacobs met in September outside a newly opened package store in Burlington, Vt. However, no explanation was obtainable as to what either one of them was doing on that spot. Somewhat earlier Jacobs had reported directly that he was planning to spend the greater part of the summer doing geological work around the State of Vermont, in order to get back his pep in the exhilaration of good Vermont air. This is his sabbatical year at the University of Vermont and he and Mrs. Jacobs are planning a round-the-world cruise on the Dollar Line, starting February 1.

A card has been received by the Secretary which was mailed from London on August 25, and the writer stated that since there were no apples and peaches to keep him at home this fall to pick and ship, or make cider, he was foot loose and could go where he pleased, if he had good luck. He had accordingly taken the steamer *Europa* for Europe. The signature was not very clear, but it looked like "Tucker" and the writing also was very characteristic of our classmate Charlie Tucker, so the Secretary believes he is safe in reporting that Tucker is away on a European trip, and that classmates can count on reading later on a little story of his tour and experiences.

The '96 Class Scholarship has been awarded this year to Frank S. Gardner, the son of our own Henry Gardner, who is at present living in Brookline and is associated with the Coppers Locomotive Equipment Company in Worcester. The boy has made a very fine record at the Brookline High School, where he won the Floyd cup for being the outstanding boy in the school. Gardner himself appeared at the Secretary's office with the boy on September 17, and Henry apologized for having been around Boston for a considerable period without having made it a point to get in touch with more of his classmates. He promised to do better in the future, so it is hoped that we may see more of him from now on.

Mark Allen has reported that he has been having a three months' furlough so to speak, having shipped Mrs. Allen off on a trip to England on the *Franconia* on June 1. Mark failed to report just how he took advantage of his wife's absence, but he has recently sent in a clipping from the *Detroit News* of Monday, September 17, giving a picture of our classmate, Welles Mortimer Partridge, who is styled "Father Partridge, mendicant friar of the Episcopal Church" and his dog, Spot, his inseparable companion on his missionary tour during the past two years. The report states that Partridge parked his ancient car in the back yard of the St. John's Episcopal Church on Saturday, September 15, and on the following day the car, the church, the pulpit, and rectory of this unusual missionary was the object of widespread interest. The complete story tells of a trip of 17,000 miles, which still

continues. He believes that he is the only mendicant friar in the country, and he travels around the country without church, funds, or support, depending upon the generosity of the people wherever he may stop. The car is pretty well adorned with boxes and gadgets, and the back part of it forms Partridge's bed, pantry, and kitchen. He claims that the car was nine years old when he bought it for \$50, but it is still going. The article fails to state in what direction Partridge was heading, but undoubtedly other places will be visited, and '96 men may have the opportunity to see and hear him.

The Gurney Callan and the Minor Jameson families seem to be running neck and neck. In a previous issue report was made of the graduation of a boy from Technology who belonged to each one of these families. Now two marriages have occurred. The Callans announced the marriage of their daughter, Priscilla Gurney, to Georges Lucien Houle on Saturday, September 1, at the Church of the New Jerusalem in Cambridge, Mass. The Jamesons announced the marriage of their daughter, Eunice, to John Bayley Fox on Saturday, September 1 (the same day), at Old Bennington, Vt. The Foxes are to reside at 77 Martin Street, in Cambridge. Gurney Callan says that his family is getting away from him. He now has three girls married, and the only unmarried children are the two boys.

The press reported the return of Paul Litchfield and Mrs. Litchfield on the *Leviathan* during August from a European trip, during which he had arranged with the Netherlands Government for the starting of a plant with a capacity of 600 tires a day at Batavia in Java, at a plant cost of \$1,000,000. The *Boston Transcript* on August 18 gave a story about Paul in connection with his attendance at the opening of the new quarters of the Good-year Service on Boylston Street the following week. The Secretary was away at that time and unfortunately did not have the opportunity to contact with Paul while he was in Boston.

Dave Beaman has appeared in person and reported on his European trip. He with Mrs. Beaman and their son sailed on the *Stratendam* of the Holland American Line on June 29, and their itinerary covered England, France, Switzerland, Italy, Austria, Germany, Czechoslovakia, Denmark, Sweden, and Holland. They arrived back in New York on September 1. Dave was most enthusiastic over the wonderful reception that they received in Paris at the hands of Arthur Baldwin, and he urges all '96 men who may be going to Europe not to fail to include Paris and a call upon Arthur in their itinerary.

Con Young wrote from his Cape Cod home on September 23 that the summer had not been all to the good with him personally, as his neuritis was rather troublesome and prevented him from doing much bathing or going about in his usual way. On account of it he had to pass up his usual fall trip to the Adirondacks. He and Mrs. Young were putting their house in order and preparing to

leave the last of September for the South, including stops in Providence, New Haven, East Orange, with visits to N. P. Rood '98 at his country place and to Joe Clary in Chevy Chase. As usual they will be in Fort Myers, Fla., for the winter.

Walter James has had a grand rest from his duties as Professor in the Department of Mechanical Engineering at Technology, having spent nearly three months during the summer on an automobile trip with Mrs. James, with Montana as his main objective. They just loafed along in Glacier Park and the Yellowstone, and other parks, and also made stops at various dude ranches where they had been before. The outing proved of marked benefit to Walter's health, in spite of the fact that on the beginning of their return journey east their automobile was ditched about one hundred miles east of Glacier Park, as the result of a sudden puncture. Not only was the tire punctured, but Walter's nose, while not punctured, was rather badly smashed. Mrs. James, who was driving, escaped any broken bones, although she was rather badly strained. The result was that Walter laid over in the hospital for two weeks or more, getting himself back in shape before the remainder of the trip east. His hospital experience, while unexpected, was nevertheless rather pleasant on the whole, according to his report. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1898

At the session of the National Business Conference at Babson Park, Wellesley Hills, Mass., under the auspices of Roger Babson's organization in the early part of September, the major theme for discussion was the effect of Government regulation under the "New Deal" upon business and investments. Strong advocates and bitter opponents of the New Deal were heard from. — Roy Peavey's son enters Tech this fall to take graduate work in food chemistry. We heard with deepest regret from him that his father suffered a shock last spring and has had to give up his work as President of the Babson Statistical Organization. We are glad to report, however, that Roy is improving so that he can get around a little.

Arthur F. Porter's son also has appeared to take graduate work in Course VI after taking a B.S. at the University of Virginia in 1933 and spending last year at Harvard Business School. — W. R. Strickland and his son, Randolph, just dropped in to see us. Randolph enters his fourth year at Tech this fall. — Frank Coombs is back on the Pacific Coast again with this address: 1145 Pine Street, San Francisco. — Miss Frances G. Curtiss has long been connected with civic service in Boston, including membership on the School Board. She has just been appointed by Mayor Mansfield to the Board of Public Welfare.

Before the East Boston Tunnel was named Sumner, a group of prominent engineers who admired Ernest R. Springer

1898 Continued

urged Mayor Mansfield to name the tunnel the Springer Tunnel. We copy their statement: "Ernest Roger Springer was born in Boston, February 24, 1876. He was a graduate of Newton High School and attended M.I.T. in the Class of '98. He served in the Spanish War as captain of a Newton company. After commencing his career with the Boston Elevated he went with several private concerns and then returned to the Elevated to become assistant engineer in charge of designing the Cambridge subway. In 1912 he was appointed an assistant engineer of the Boston Transit Commission. In 1918 he was engaged in large measure on Government work.

"In 1920 Mr. Springer was appointed chief engineer for the transit department of the city of Boston, which position he held until his death on February 19, 1933, caused, at least in part, by the nature and stress of his labors to which he gave himself unstintingly. Under his direction, the Arlington and Kenmore stations of the Boylston street subway were designed and built. He also designed and supervised the intricate construction of the Maverick station of the East Boston tunnel which necessitated changes of a major character in that portion of the tunnel. Also under his direction the design and construction of the Dorchester rapid transit line from Andrew Square to Mattapan was brilliantly carried out.

"As far back as 1920 he had been responsible for changing earlier designs and locations for the traffic tunnel into that which he was ultimately to build. The design, the location, the engineering, and the supervision of construction were all his work and, like Clifford M. Holland, engineer of the Holland Tunnel at New York, who lies at rest at Somerset, Mass., Ernest Springer, another great Massachusetts engineer, succumbed to his supreme task when construction was completed and success assured.

"As Holland's life and labors were rewarded by the naming of his tunnel for him, and as the Oakland-Alameda tunnel in California is named in honor of its builder, so it is proposed that the traffic tunnel under Boston Harbor be named the Springer Tunnel. This will perpetuate the memory of a Massachusetts engineer whose abilities were known far and wide, whose private life was clean and decent, and whose application to his work, his helpfulness to younger engineers, and the affection in which he was held by his associates should be an inspiration to all those who believe in the worth while qualities of life.

"Ernest Springer was a sincere and earnest man. He was not a politically prominent figure, he never achieved fame by publicity, he was simply an excellent engineer building public works to endure. His name and example deserve both recognition and remembrance. A tunnel should be named for an engineer — preferably for its builder — especially when the task of construction unquestionably hastened his untimely demise. It is a noble sentiment that causes men to name a public work for a fellow man,

particularly a member of the engineering profession which has done so much for mankind and yet is so often unrecognized and unappreciated. And finally it is especially desirable that at least one example be provided whereby a very great public work be named for a relatively inconspicuous man to show that a life well led and work well done can have its reward in public appreciation." — ARTHUR A. BLANCHARD, *Secretary*, Room 4-160, M.I.T., Cambridge, Mass.

1901

It has always been my experience that when bad news has to be transmitted it is kinder and wiser to do so directly and without circumlocution. It lessens both unhappy suspense and ultimate anguish. The story is briefly this: In my last communication from the Editors of *The Review*, I find an item, the baleful import of which will be but too apparent to you. I quote: "The Editors urge all class secretaries to send in to *The Review* any news items they may encounter concerning Technology men, even though they are not members of the secretary's own class." As if our burden were not sufficiently heavy already with the jejune paternalism of the present administration. No longer may you pursue your innocent avocational activities safe from the prying eye of your Secretary — a horde of what I believe to be designated in commercial circles as "go-getters" — the "at" has been lost somewhere in the shuffle — are on your trail and those priceless items in your local journals that have heretofore escaped my eye because I don't see 'em, will now be blazoned forth in all their shameless splendor. Fellow Rotarians will stabilize their gyrations, translating their spinning to once too often told tales; brother Kiwanians will extol your fraternal virtues in the magazines dedicated to such bilge, and their fellow Indians pass the word along. I could elaborate at length; anyhow, you are warned, and I offer to your parched lips the one drop of Hope left in the chalice. I'll edit carefully the news items that deluge me from those self-appointed censors of '01.

In token of which Lammot duPont, who, as I write, is gratifying the simian curiosity of a few of the "boys on the pay roll" in Washington, sends me word of the birth of his son, David F., on August the 18th of the current year. David, whom I hope to welcome at some later propitious time when the teeth have come and the unruly gastrointestinal tract settled to its steady beat for the long race, David, I repeat, comes into this world doubly blessed. Not only is he the son of our good friend, Lammot, a distinction, it is true, that he shares with his many brothers, but he is born an uncle to a whole clan of nephews and nieces who in exceeding his years fall far short of approaching his authority. Looking ahead pleasantly into the years to come, one may see him, safe in his avuncular status, dealing out merited castigation to those others who enjoy only the ephemeral advantage of a chronological su-

periority. Lucky David — and it won't be unwholesome for the aforesaid nephews and nieces. Privately, I don't think that David's advantages would be shared by one who entered this mundane sphere full panoplied as a great-uncle. But sufficient unto the day, as the patent inside newspapers so delicately phrase it.

A post card earlier in the summer from Bill Vermilye placed him as touring France and Italy during the summer months and due to return at about this time of writing. His card came from Dijon and bore a lively presentation of the Tour de Bar which I hasten to add does not indicate a dispensing point for alcoholic beverages. Anyhow, Bill knows his chateau bottling, and while his journey may have had a gracious note of reminiscence, it was not that avid search for vintage lore which actuates so many of the new rich under our present benevolent readjustment. "Hell, bring me 50 dollars' worth of ham and eggs" embodies more nearly their cultural response to changed conditions.

Fred Clapp is making one of his infrequent home visits, arriving in this country just ten days too late to welcome David. The family knowledge is too slight for them to note any change. They seem satisfied, however, and we can all congratulate Fred on renewing old acquaintance with a charming family circle. To the reporters, Fred expressed regret that there was not enough oil in the stratosphere to warrant investigation. He's a bit like Alexander.

Fred Freeman introduces a charming leisured note in the letter which has just reached me. He casually remarks that he assists in the housekeeping "by adventitious contributions of salmon in the spring and grouse and woodcock in the fall." It's a hard life, I'll say. It seems almost too bad for me to acknowledge publicly my fondness for both grouse and woodcock. Their adventitious character need offer no impediment.

Next spring, there will be doings. We reunite, if there be such a word, which I candidly doubt, and then we join the other — and perhaps slightly less worthy — alumni in a bust. You'll be hearing from me from time to time about it — a promise, forbid the alternative. — ALLAN WINTER ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

1904

A communication from Professor Locke giving a quotation from a letter written to him by Mrs. Ralph E. Adams gives some details regarding Adams' death, which occurred on May 30, 1934, and which will be of interest to those of us who knew him well.

"His going was most sudden and unexpected. The two years we have been in Ft. Collins he has been in very good health and we had received every assurance from our Denver physician that Ralph still had many years to look forward to. His death was brought about by a clot which I now feel certain was several weeks in reaching his heart. With the exception of a peculiar numbness be-

1904 Continued

tween the shoulders he had complained of no ill feeling. We spent the day as usual. Talked over in detail plans for a week's trip as soon as school was out. About three o'clock Ralph went upstairs and possibly a half hour later I followed, finding him on the bed apparently having a chill. He tried to speak to me but I could make nothing of what he said. Becoming very much alarmed I called a doctor, who responded immediately. After making a hasty examination he told me nothing could be done as a blood clot had entered the left lung and would shortly reach the heart. A very few minutes later the end came."

A clipping from the Boston *Globe* of May 15, 1934, gives us some information with reference to Robert Bellows:

"Robert P. Bellows, 9 Park Street, Boston, nominated by Massachusetts Institute of Technology, was appointed to the Art Commission by Mayor Mansfield yesterday to succeed Chairman Charles P. Maginnis whose term has expired."

At Greenfield, Mass., on March 31 Alden Drew was married to Miss Octavia M. Conant and the following account of the wedding was taken from the Boston *Herald*: "Miss Octavia M. Conant, daughter of Judge and Mrs. Samuel D. Conant of 3 Grinnell street, was this afternoon married at St. James Episcopal Church to Alden Glover Drew, assistant election commissioner of Boston. The ceremony was performed by the Rev. William H. Cole, and was followed by luncheon at the Weldon Hotel and a reception at the home of the bride. The bride was born here, attended Pratt Institute, Brooklyn, N. Y., and has been Secretary to the principal of Bay Ridge High School in Brooklyn. Mr. Drew was born in Boston and was educated at Mechanic Arts High School and M.I.T. Both are of Mayflower ancestry. The couple will reside in Boston."

In the October issue of the magazine *Fortune* is a long and very interesting account of the development of Technicolor. As you all probably know, these colored moving pictures were developed by Dan Comstock and Herb Kalmus who started work on them around 1914 and worked together for a number of years under the firm name of Kalmus, Comstock and Westcott. Eventually this firm was dissolved and Kalmus has kept on with the development of Technicolor until at the present time it is the outstanding development in colored moving pictures. I well remember their first showing which was given in Tremont Temple and recently I witnessed a production in Keith's Memorial Theater of their most recent offering. The progress made was astounding and the latest offering of Technicolor is a very beautiful thing.

The article in *Fortune* is much too long to attempt to reproduce or even to abstract in these notes, but it is well worth reading and I would recommend that you all make an effort to see a copy of this issue of *Fortune* and read the article. It describes in detail the progress made and in very simple terms the methods by which

the present results have been attained. — HENRY W. STEVENS, *Secretary*, 12 Garrison Street, Chestnut Hill, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, 8 Rosemary Street, Chevy Chase, Md.

1905

It is a treat to receive a classmate in Middletown. It was a great disappointment to learn that Arthur Manson, VI, had stopped and tried to find your Secretary one day in June when he was away. Later it developed that Arthur was on the way to his son's Commencement at Tech.

But on August 3 the strangely familiar voice of Ray Bell, II, came over the phone to announce that he was at the Yacht Club. It took us no time to get down. There he was, on his 45-foot yawl, looking every inch the sailor, but somewhat stouter. Important business could not prevent our having an interesting half hour's talk, but it was much too short.

Later in the month a little fellow approached our door and rather quietly asked: "Is Mr. Davis in?" We eyed him for two seconds and replied: "Yes, Walter." It was Walter Clarke, XIII, whom we had not seen since school days. He had changed little and we had a fine get-together but, again, all too brief. He is still in Beaver, Pa., and had been through Quincy, Mass., where he had seen Charlie Leavitt, XIII.

And, early in September, Toots Dissel, II, walked in. All we could learn was that he was here directing some kind of merchandising survey. But why in this out-of-the-way spot? It was good to see Toots again. Our other contacts have been mostly at reunions. Quite an '05 summer!

Having occasion to do business by telephone with a sanitary laboratory in Hartford, we were amused to have the man on the other end announce himself as Jim Newlands, XI. We hope to report an interview shortly. — Another classmate has appeared in Hartford, Mrs. Thomas N. Hepburn, née Katherine M. Houghton, IV. Some Charlie-Channing developed the astounding fact that the great Katherine Hepburn is a daughter of '05. Now, if Mrs. Hepburn brings her daughter to the next class reunion, as other classmates have done before, there will be no doubt of its success.

Washington has snared another member of the class. Professor Royal Bradbury, I, is connected with the Wire Reinforcing Institute, National Press Building. Why Prof.? — Maybe Ben Lindsly has been caught. He was reported in Washington in August. — Clarence Gage, II, one of Tech's honorary secretaries, is now in Milwaukee. — A photograph in a Boston paper of a group of business leaders includes Sid Strickland, IV, chairman of the State Board of Housing. — Ralph Hadley, I, has just graduated a girl from Wisconsin and is entering a boy at Tech. — Bob Cutting, II, who has had previous addresses all over the world, may now be found at 402 Audubon Street, New Orleans. — Looie Killion, I, is missing. Can anyone help?

Last March Lovell Parker, I, chief of staff of the joint Congressional Committee on Taxation wrote from Washington: "Just now we have a new revenue bill under consideration. The main purpose of the bill is to plug up loopholes to tax avoidance in the income tax. The trouble is that the loopholes come of all shapes and sizes and the plugs we have on hand don't always fit. We need some rubber plug that will stay in place. The rubber plugs we have tried so far tend to jump out of place. Anyway we have saved the Tech men \$32 on their next tax return (for 1934) as we have put in an earned income deduction. I assume all Tech men are still working." If that is true, it is fine. Lovell sent along a newspaper photograph of himself telling the Committee that the bootleggers had 50,000,000 gallons on hand.

In the July notes was a reference to our freshman band. It evidently stirred up Will Hall, XIII, Captain in the Navy, who wrote: "I have enjoyed reading over *The Review* very much indeed, and it takes me back to 1901-02, even though the buildings and equipment have changed materially at Technology since that time. To show you that I have read part of the magazine, I will state that I not only remember the time the third trombone filled his horn with water, but I am still telling about the incident. Also, the annual review when we dressed Friar Tuck up as Drum Major with the curtain cord, and unless I am mistaken the same third trombone stepped on one end and caused Tuck to miss his baton as it was coming down. Furthermore, I haven't forgotten when one half of the band danced with the Prince of Pilsen company while the other half played, up in the gymnasium of the Armory. Thirty-three years is a long time, and it is quite possible that I remember more about these incidents than I do about my studies." The Captain doesn't say which half of the band he was in.

Ralph Hadley, I, who says he is playing better tennis than the youngsters, furnishes a lead on George Hool, I, who was "last heard from in December, '33, when he was located in a N. Y. hotel, expecting to receive a contract for his syndicate to build apartment houses for the government in Latvia. Later I saw a news item stating that the contract had been awarded a N. Y. syndicate." — Jules Barnd, III, writes from Lima, Ohio: "I am thinking of getting back into the mining business. I quit it some ten years ago, after spending some 20 years operating in Nevada. With gold and silver up in prices, it looks like some of the old producers will again become active and I am looking some of them over."

From Frank Elliott, III: "Please note my change of address, Box 212, Coshoc-ton, Ohio. (80 miles east of Columbus.) I have moved my family and business from Lynn, Mass., out there, which is much nearer the center of distribution for our product (business calendars) and therefore much better for me in every way." — Ed Burkhardt, XIII, who was at Wesleyan in June for his son's Com-

1905 Continued

mencement, seemed pretty well recovered from his illness of the spring. — James T. Lambie, II, Jr., Princeton '34, was by vote of his class, declared to have had the "biggest drag with the faculty." Ask Dad, he knows. Jim, Jr., who was chairman of the *Daily Princetonian* and of the Student-Faculty Association, was adjudged the "best all-round man outside of athletics." — Bill Lalley, XI, resigned as President of the Kelly-Springfield Tire Company in July and went on a tour of Europe. — Dan Adams seems to have completed his Paris course for we have a Pelham, N. Y., address. — Dow Nicholson, I, has been transferred to the navy yard at Bremerton, Wash.

Norman Lombard's, II, new book "Monetary Statesmanship" came out in July. In a review in the *Sun*, William McFee says in part: "No review could describe adequately, even if the reviewer were a professor of economics, the large number of problems with which Mr. Lombard, out of the fullness of his knowledge and experience, deals with patient lucidity and persuasive eloquence. His objective is to make us distinguish between money and wealth, to authorize our statesmen to modernize the monetary system so that it bears some relation to our productive capacity. He has written a singularly readable and convincing book. It would be an excellent but impracticable scheme to compel all citizens wishing to vote at the next election to declare that they have read the book."

Two more classmates have passed away: Charles R. Prichard, II, on June 25 and Robert H. W. Lord, X, on July 29.

Prichard was vice-president and general manager of the Lynn Gas and Electric Company and recognized among the leaders of the gas and electric executives of New England. He had been seriously ill during the winter but had improved and gone south for a month. Upon graduation he joined the Beverly Gas and Electric Company, later becoming Treasurer and General Manager. In 1920 he was called to the Lowell Gas and Electric Company to straighten out a difficult situation, which he did. In 1925 he went to Lynn as executive vice-president and general manager. He was energetic yet amiable and an able executive with a keen interest in all that concerned the company and its employees.

He was a director or officer of several gas and electric companies and active in his trade associations. He was a member of the Corinthian Yacht Club, the Oxford Club and the Lynn Rotary Club, and Vice-President of the Lynn Chamber of Commerce. He leaves a wife and three children.

Bob Lord's undergraduate activities are well remembered: Class Secretary, second and fourth years; mandolin club; toastmaster, class dinner; marshall, republican torchlight parade; member of Round Table and Mandaman, Osiris. He was in everything. Of those early days Grove Marcy, II, writes: "My principal recollection of Bob as an undergraduate is of a fellow marked by his absolute sincerity. He was full of fun, with no pretense whatever, but still I think his outstanding characteristic was sincerity.

Whenever he assumed a responsibility he carried it out completely. This was particularly marked in the work he did as Class Secretary in the years immediately following graduation. He certainly started us off on the right foot and kept the class spirit alive in a way that made it much easier for us who followed him in that job."

Of later days Hub Kenway, II, one of Bob's oldest and best friends, wrote a long and beautiful letter from which we have chosen the following: "Immediately on leaving Tech, Bob went to a tannery in Foxboro, Mass. He always had his eye on tanning as a profession and he went straight to it. During the summer, however, the tannery burned down with all Bob's books and instruments, and on account of this interruption he joined Bob Folsom, X, at the New England Gas and Coke Works. Then Bob became manager of the Ireson Tannery in Gorham, Maine, and an eminent citizen of the town. He was chief assessor and President of the Gorham Board of Trade. He was married in 1912, while in Gorham, to Rebecca C. Poole, but had no children.

"About 1918 Bob joined his brother in the Widen Lord Tanning Company at Danvers. Some years later Bob and his brother organized the Lord Tanning Company which they established in Woburn, where they worked hard and prospered, turning out fine upper leather. Bob had a most unusual gift of winning the personal friendship and loyalty of every one of his tannery men and all their families as well, and spent uncounted hours in helping them in every difficulty — physical, financial, and domestic. Bob was a genius in his relations with labor and every man he ever dealt with worked for him with enthusiasm, loyalty, and affection. You and I, Ros, have lost a dear personal friend but I believe, in Bob, '05 has lost the best all-around man that ever represented it." — ROSWELL DAVIS, Secretary, Wes Station, Middletown, Conn. SIDNEY T. STRICKLAND, Assistant Secretary, 20 Newbury Street, Boston, Mass.

1906

Observing classmates may recollect we had some notes in the October Review which might imply we have joined the Nine-Issue Club of ambitious secretaries who include notes in every issue. As explained previously, the standard Review practice calls for notes from 1906 every other month. Through a misunderstanding, however, notes were sent in for October. Hence, the notes two months in succession.

With further reference to Dr. O. S. Pulman who has been recently elected President of the Babson Reports, Inc., it has been noted that he figured prominently in the Twenty-First Annual National Business Conference which was held at Babson Park in September.

The death is reported of General Theodore Bingham, known to classmates as the father of Rutherford Bingham, who was a member of our class for awhile but since graduation has affiliated with 1907.

General Bingham figured very prominently in the newspapers shortly after our graduation as Police Commissioner for the City of New York.

The Kansas City *Times* of May 31, 1934, included the following obituary of Hermann Henrici whose death was mentioned in the October notes: "Hermann Charles Henrici, widely known consulting engineer and an active leader in Kansas City Boy Scout and civic affairs, died at two o'clock yesterday afternoon at his home, 430 West 58th Street. He was 49 years old. Mr. Henrici had been ill since last September, when he was forced to give up his work because of a heart ailment. Friends thought that he had recovered to a great extent and it was believed he soon would return to his office. He told Mrs. Henrici yesterday afternoon he desired to sleep. A few minutes later, Mrs. Henrici was attracted to the room by a noise. She found Mr. Henrici unconscious. He died almost immediately.

"A graduate of Manual Training high school in 1902, Mr. Henrici completed courses in mechanical and electrical engineering at the M.I.T. in 1906. He was graduated with honors. In 1907 he married his high school sweetheart, Miss Lois Oldham. Returning to Kansas City from school, Mr. Henrici was employed in the engineering department of the Bell Telephone Company. Later he established an electrical contracting company. The firm of Henrici-Lowry Engineering Company was formed in 1913 by Mr. Henrici and W. Malcolm Lowry. In the engineering firm, Mr. Henrici had charge of the valuation work for the United States Department of Agriculture. With Mr. Lowry he designed electric and water systems for many cities and conducted many appraisals. Mr. Lowry, a boy school friend of Mr. Henrici, will continue the company.

"The engineer found time for many civic activities. He had no children. He was President of the Kansas City Council of Boy Scouts in 1929. He was a former President of the Rotary Club and the City Club, and was active in the affairs of the Westminster Congregational church. He was a member of the Engineers' Club, American Institute of Electrical Engineering, and the American Society of Heating and Ventilating Engineers. At one time he was master of Temple Lodge No. 299, A.F. and A.M. He was born August 7, 1884, the son of Mr. and Mrs. William C. Henrici. The father was an early day banker in Kansas City. The widow and a brother, Herbert Stanley Henrici, of Tulsa, survive." The funeral was held June 1.

With further reference to the accidental death of Howard C. Blake, E. G. Farland, Secretary of the Technology Club of Chicago, has written to Profesor Locke as follows: "With a great deal of sorrow we just learned of the death of Howard Colburn Blake, who was with us in Chicago, but who has been living in Detroit these past few years. You will find an obituary clipping enclosed, from the Detroit *Free Press*, July 13, 1934. Mr.

1906 Continued

Blake was really outstanding in his helpful activities with the Chicago Club, was extremely well liked and well known by a very large number of our men here. He always was promptly forthcoming with financial assistance in our affairs, as well as taking an active hand in promoting the welfare of our Club."

The clipping referred to reads: "Funeral services for Howard Colburn Blake will be held at 2:30 P.M., Friday, from the residence at 532 Brookside Drive, Birmingham. He was instantly killed Tuesday evening in an auto collision near Somerset, Mich. Mr. Blake, who was a well-known engineer, served as architect's representative in guiding the construction of the Michigan Theater, the Detroit Leland Hotel, and the Fisher Building. He was born July 14, 1886, in Boston. He was a graduate of the Mechanics Arts High School of Boston and the M.I.T. He was a member of the American Society of Civil Engineers, the American Society of Mechanical Engineers, and the Western Society of Mechanical Engineers. During the World War, Mr. Blake served overseas for two years as Engineer's Officer in charge of construction in the Romorantin and Gievres district. Surviving are his wife, Sarah; two sons, Francis and Howard, Jr., and a sister, Mrs. Charles Harding, of Boston. Cremation will take place at White Chapel Memorial Cemetery, following the funeral services."

The following items concerning Course III men are from Professor Locke: "F. W. Libbey is at Aguila, Ariz., supervising operations at Nellie Meda gold mines, where the mill recently constructed by the Wenden Copper Company has started ore treatment. — Ray Barber, mining engineer of Palo Alto, Calif., is supervising the building of a steel suspension bridge across the Trinity River, above Junction City, to carry a large syphon for water from Canyon Creek to the Dutton Creek and other properties he took over earlier in the year. He is also reported to have bonded certain gold placer properties near Weaverville, Calif., which he had previously examined. These included the Dutton Creek, Steiner flat, Indian Creek and Douglas."

The Secretary wishes to acknowledge the assistance of Charlie Wetterer in forwarding material used in the October and November notes. Charlie's business time is practically all spent in New York, making his home at the Hotel Roosevelt; while his family is living in Melrose, Mass. His interest in these notes certainly wins him recognition as our New York correspondent. With a few more like him we would be tempted to join the Nine-Issue Club. Incidentally, he advises that he ran into Bob Hirsch as he was passing through the Grand Central Station. As far as known, Bob is still with the New Jersey Zinc Company, had just returned from a business trip, and was shortly leaving for another. — J. W. KIDDER, *Secretary*, Room 1001, 50 Oliver Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

1907

Being without news except for one item received from Professor Locke to the effect that H. J. C. MacDonald has returned from his long stay in Russia and is now at 8-A Holley Chambers, 33 Washington Square, West, New York City, the Secretary attempted to contact by telephone a few men living in the vicinity of Boston. As the result of these calls he learned the facts here recorded.

Charles B. Hamilton, who has lived in Belmont, Mass., died on March 6, 1934. Many years ago he suffered an injury to his eye that prevented his carrying on chemical work and he was engaged in music publishing business for several years with a store on Massachusetts Avenue in Boston. For the past ten years he has been a dealer in salted nuts. He is survived by a widow and a 14-year-old son who live at 53 Leslie Road, Belmont, Mass. — John Kimball, whose home is at 141 Perkins Street, Melrose, Mass., is an engineer with Stone and Webster Engineering Corporation, a position he has held for many years. Just at present he is doing appraisal work for the firm. He has two boys, one a junior in high school, and the other, age 12, in junior high.

Ray E. Shedd has been in the employ of the Commonwealth of Massachusetts for 26 years, in what was formerly the State Highway Commission, now the Department of Public Works. He is senior civil engineer, with office at 100 Nashua Street, Boston. He lives at 73 West Chestnut Street, Wakefield, Mass., with his wife and two children, one a son 20 years old who is entering Tufts College this fall, and the other a daughter, age 16. — Everett E. Tuckington continues his work as electrical engineer with the Associated Factory Mutual Fire Insurance Companies at 184 High Street, Boston. A 20-year-old daughter, who is a senior at Jackson College (the women's college at Tufts), and a nine-year-old son, together with the wife, make up the family who live at 6 Geneva Road, Melrose, Mass.

Donald E. Russ who lives at 1 Clarina Street, Wakefield, Mass., has been manager of the coal business of L. E. Bennett in the same town since 1921. He has two daughters, both of whom are married, one living in Wakefield and the other in Reading, Mass. — BRYANT NICHOLS, *Secretary*, 12 Newland Street, Auburndale, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1908

We have one wedding and one engagement to report in this issue. Mason Tuxbury Whiting was married in May of this year to Miss Harriet Huntington Smith of Cohasset, Mass., and Omaha, Neb. The wedding took place in Leslie Lindsey Memorial Chapel, Boston. — The engagement of Miss Katie Jaeger to Gregory M. Dexter was announced by Miss Jaeger's parents on June 8, 1934. The wedding is planned for this fall.

THE TECHNOLOGY REVIEW

Harry P. Sweeny returned to the United States from a professional trip to Guatemala early in June. He reports that his work was very interesting, although traveling was rather difficult. He may possibly return to Guatemala later to carry on further work. — G. Temple Bridgman, Consulting Engineer for Gugenheim Brothers in New York, has also traveled considerably this summer, having made a trip to the Malay States. — LeSeur T. Collins has been made Vice-President of John D. Curtis and Company, Inc., formerly Curtis, Stephenson and Company, Inc., Boston investment house.

It is with deep regret we report the deaths of two classmates. Arthur C. Winch died suddenly at his home in Framingham, Mass., on April 7, 1934. He had served the town of Framingham as park commissioner and on several occasions as member of the public works commission. — Word has been sent to us from Wheaton Griffin of Utica of the death of Howard Batsford, which occurred on July 12, 1934. He had been troubled with heart disease for some time, but the news of his death was a great shock to his many friends. Besides his widow, he leaves two sons and four brothers and four sisters.

Changes of Address: Prof. Henry W. Blackburn, 1113 Lancaster avenue, Syracuse, N. Y.; Allston Dana, 25 Fifth Avenue, New York City; Lt. Commander Herbert A. Ellis, 20 Moss Hill Road, Jamaica Plain, Mass.; Alexander M. Emerson, Ardsley Road, Scarsdale, N. Y.; William C. Folsom, 64 Liston Road, Melrose, Mass.; Prof. Carl E. Hanson, Marquette, Kansas; Oliver S. Jennings, 41 Douglas Avenue, Mansfield, Ohio; John R. Kibbey, 9437 Santa Monica Boulevard, Beverly Hills, Calif.; Charles C. Kinsman, 9921 Longwood Drive, Chicago, Ill.; Edward Kloborg, 48 Harding Parkway, Mount Vernon, N. Y.; Frederick W. Lyle, 1028 South Avenue, Wilkesburg, Pa.; Albert L. Messer, 229 Albion Street, Wakefield, Mass.; George Schobinger, 1401 Arch Street, Philadelphia, Pa.; Alexander C. Sloss, 822 Wealthy Street, Grand Rapids, Mich.; Clarence H. Spiehler, Columbia Engineering Corporation, 323 Plum Street, Cincinnati, Ohio; Chester L. Standley, 19 Norwood Avenue, Manchester, Mass.; John T. Tobin, Covell Smokeless Coal Company, Pansy, W. Va.; Roy S. Watson, 2557 North Terrace Avenue, Milwaukee, Wis. — HAROLD L. CARTER, *Secretary*, 185 Franklin Street, Boston, Mass.

1909

The following is an excerpt from a review by S. F. Kelly of John Mills's new book, "Signals and Speech in Electrical Communication," which has just been published:

"Tell 'em what they need to know, and no more, says the author in his introduction, after quoting his assistant's description of a magneto tachometer as being 'black and about the size of a potato.' The remark earned for the assistant an almost mythical reputation as

1909 Continued

a popular expositor of science. John Mills's reputation has a much firmer basis, however, if the present book is a sample of his achievements along that line. Himself an inventor in the field of electrical communication, he has bravely, and very successfully, attempted to put in simple language the basic facts underlying it, and to describe some of the difficulties besetting the perfection of the telephone, the radio, the talking pictures, and television. Mathematical formulæ and diagrams being classed, in his opinion, as among those things the layman doesn't need to know, none appear in the book. Despite this self-imposed limitation, he achieves an astonishing clarity in his descriptions of instruments and circuits. The account is neither dressed up in dramatic hyperbole, nor 'dumbed down' to near moronic levels, but is a clearly told story addressed to intelligent people who seriously want to know something of what happens when an electric current transmits speech from distant places.

"The book contains 16 essays on various phases of the subject, each essay complete in itself, but all so knit together as to make a consecutive whole. Beginning with 'The Vivisection of Speech,' the author shows what happens to the various components of spoken sounds during electrical transmission and reproduction. He goes on to tell how vibrations of speech are impressed on the electric current which recreates them again, possibly thousands of miles away."

C. L. Dawes, Assistant Professor of Electrical Engineering, Harvard University, Cambridge, has been awarded the 1933 American Institute of Electrical Engineers' Northeastern prize jointly with his co-author, P. H. Humphries, for their paper, "The Electrical Characteristics of Impregnated Cable Papers." — At the 53rd Annual Convention of the New England Water Works Association, held at the Hotel Statler, Boston, Mass., in September, Arthur L. Shaw was one of the speakers in the Symposium entitled "Experiences with P.W.A. and other Governmental Agencies for Public Works Construction." — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. *Assistant Secretaries*, PAUL M. WISWALL, 250 Park Avenue, New York; MAURICE R. SCHARFF, 1 Wall Street, New York; GEORGE E. WALLIS, 1243 West Washington Boulevard, Chicago.

1910

Here is a letter from Van Court Warren: "Knowing my habits and how long I have planned to say 'It is a long cry from a little town up in Belgium where we sat down to mess along in September or October of 1918,' I think maybe I had better use this sheet of paper. Those 16 years have passed very fast, and also very slow, the last few especially as a consulting geologist and mining engineer. Heard tell of the Depression, too. Last summer, Mrs. Warren and I decided the country life was just what we needed, so by September we had pulled up stakes

and moved into Auburn (Calif.) with our three children, the dog, turtles, and other belongings. For those of you who still live in the 'Effete East,' this Auburn is not the same kind of a place as they have in New York state.

"As consulting work is turning into gold mining, this location is ideal to work out from. I have been very busy and the work is most enjoyable as well as the people and our surroundings. As a miner, I am called on for most any kind of a job, from taking groceries out to truck driving and being a general roustabout as well as mining engineer. There are not many Tech men around, but I have run across two during the past year, Phil Hart, who shows up in San Francisco on the big bridge jobs, also Gordon Hawes, who lives in Palo Alto. He came through here once but I was away. — Now you cannot say I have not answered your letter promptly." — DUDLEY CLAPP, *Secretary*, 40 Water Street, East Cambridge, Mass.

1911

As these notes are being typed, I have just returned from what has come to be one of the most enjoyable long week-ends of each year — when I attend the Freshman Camp conducted by the Technology Christian Association at the Y.M.C.A. Camp in Dunstable, Mass. In addition to my activity from Friday to Monday at the camp, I stayed over in Boston for the Freshman Smoker on the evening of Registration Day and entertained the Tech youngsters and many of their dads as well as taught them Tech songs and cheers.

In the audience I spotted A. O. Wilson, I, and going over to his table I met his son, Albert, Jr., who is in this year's freshman class. He is following his Dad into the building trade, planning to take Course XVII, Building Construction. Al, you know, is President of the A. O. Wilson Structural Steel Company, with a plant in Cambridge, Mass.

President and Mrs. K. T. Compton of M.I.T. were Mrs. Denison's and my guest at dinner early in September and from him I learned that A. V. DeForest, XIII, was joining the Institute's Mechanical Engineering staff this fall as an associate professor. I called on DeForest in his new office the day Tech opened this fall and found him most enthusiastic about the laboratory he is about to create and operate, with a view to further studies of fatigue in metals and the correlation of the magnetic and mechanical properties of metals. A. V. has long been a keen student along these lines and already has some revolutionary ideas as a result of patient and thorough research.

Had a nice letter from Dick Ranger, VIII, the soul and genius operandi of Rangertone, Inc., Electric-Music, in which he said: "We are still busy with electric music — making small, compact organs that do the work of the great big ones. The electric chimes on the NBC networks are an example of the work. Found a sure way of getting a vacation each year and that is by arrang-

ing to take a bunch of kids from our 'electric choir' to the Newark Y.M.C.A. camp every year. Some 50 went this year. All I have to do is deliver them to the camp, then just loaf around and see that they have a good time, which they surely do."

Dick also enclosed a clipping from the Newark Evening News describing yachting activities at Barnegat Bay, Essex County, New Jersey. It said: "William J. Orchard (our Bill), who, during the winters is a sort of 'supreme court' for Maplewood affairs, is commodore of the B.B.Y.R.A. He has three sons who take part in the races and a ten-year-old daughter, Betty, who became a young yachtswoman last year." Dick adds that Bill is also "very much a 'major domo' for Belleville, New Jersey, where the Wallace and Tiernan (M. J., 1910) plant he manages is located."

Once again I must appeal for more letters from classmates. You don't want to continue having the class notes as short as they are this month and were last month, but the only sure way to have them longer is for you and you and you to write to Dennie. So what? — ORVILLE B. DENISON, *Secretary*, Douglas Hill Inn, Douglas Hill, Maine. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

Another 1912 man makes his mark in the world! The Boston Globe has the following to say of James Cook, VI: "James A. Cook, of 165 Burrill Street, Swampscott, today was made General Manager of the Lynn Gas and Electric Company to succeed Charles R. Prichard ['05], who died June 26. Mr. Cook was born in Peabody in 1890. He graduated from M.I.T. in 1912 with a degree of B.S. and later became connected with the General Electric Company of Bloomfield, N. J. Subsequently he was with the Cleveland Construction Company as a designing engineer; for seven and one half years was with the Edison Company of New York and with the E. C. and W. B. Jackson Company of Boston and Chicago. For the past nine years he has been superintendent of the electrical department of the Lynn Gas and Electric Company, one of the largest public utilities concerns in this section. He is a member and past chairman of the Lynn section of the American Institute of Electrical Engineers, holds a fellowship in the national organization, and is a member of the American Society of Illuminating Engineers. He is well known throughout Greater Boston."

Dick Wallis, I, has written a very interesting letter describing his work in connection with the new North Dakota State Capitol, at Bismarck. This building is novel in many respects as all the State offices are housed in an 18-story wing of typical office building construction. Connected to this by a Memorial Hall is the Legislative wing which contains the Governor's suite and Chief Justice Chambers. Dick is with Lundoff-Bicknell Company, contractors on the job.

1912 Continued

Now that Daylight Saving is a thing of the past, why not use one of the long winter evenings to write Shep or Mac? — **FREDERICK J. SHEPARD, JR.**, *Secretary*, 125 Walnut Street, Watertown, Mass. **D. J. McGRATH**, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York, N. Y.

1913

A few address changes come first to hand. George Forrester is back in his home town of Clinton, Mass., after living in some of the paper-making cities. His last residence was Holyoke. — **Paul Franklin** is now living in Needham, Mass., having moved from Maplewood, N. J. — The Army has certainly kept Ed Gere on the move. After a brief residence at Langley Field, Va., he is now in Washington, apparently doing staff duty. — **Arthur Hirst** has finally deserted Fall River, and taken up his abode in Andover, Mass. Last year we told you about his going into the chemical and dye business.

We received a very pleasant surprise one Sunday morning in August. En route to a New York train at the Back Bay Station, we thought we saw a very familiar face. It appeared again on the train platform, and inquiry disclosed **Myles Langley**, traveling to Philadelphia. We had not seen Langley since graduation. Except for the usual gray hair and a slight increase in weight, he appears just the same as he did 20 years ago. Langley lives in Portland, Maine, and is a partner and vice-president of the Portland Packing Company. He promised to write something about his career in the canning industry. — A new address is recorded for **Ray Palmer**: Holyoke, Mass.

Another classmate is moving up the ladder. Last year we wrote about **A. L. Loebenberg** becoming director of manufacture, and Vice-President in charge of sales, for the National Aniline and Chemical Company, Inc. He has just been made Vice-President and assistant to the President of the Barrett Company, with executive offices in New York. He is living on West End Avenue in the same city. — **Saw Cross** and **Cotton** in the Institute buildings during the middle of September. — **A. L. TOWNSEND**, *Secretary*, Room 3-435 M.I.T., Cambridge, Mass.

1914

Over the protest of **Sousa Brooks**, who says, "Who cares," note is made that another patent has been issued to a classmate. **J. W. Horton** has just added to his already large collection of patents one entitled "Electro-optical Image Production," which is short for Television.

Hendrickson, who was with the Holtzer Cabot Company for many years before its reorganization, is now back at Technology in the Division of Industrial Cooperation and is engaged in personnel work.

During the 20-year reunion **Herman Affel** took some splendid movies which are now available to any group in the class who would like to see them. It is suggested that in any city where there

are even a very small number of classmates they get together and show these pictures. They are on 16-millimeter film. Just write your Secretary about them.

The Alumni Athletic Advisory Council is making its annual appeal for Alumni help. The cause is truly worthy. Athletics at Technology are something to be well proud of. They are now run for the sport of it rather than from an intercollegiate competition basis, and a large number of all classes participate. Each class is asked for \$50. Can and will 50 of the class contribute one dollar each? If so, please send your contribution to either of your class secretaries for forwarding as a 1914 contribution.

Doc Leslie, when asked regarding his present activities, replied in his usual prompt, precise manner as follows: "After leaving the Army, I started work for the Thomson Electric Welding Company of Lynn, Mass., and in 1919 represented them in Buffalo, N. Y. From 1920 to 1927, I had their Chicago office. During 1927, I started my own business on the West Side of Chicago, known as **Leslie Welding Company** and have been at it ever since. The business consists of the fabricating of metal products, principally on a jobbing basis.

"In February, 1920, I married **Via Carter** of Clifford, Ont. I now live in a suburb to the west of Chicago and have three children, a boy 13 years old, and two girls, aged 11 and 6." — **HAROLD B. RICHMOND**, *Secretary*, 30 Swan Road, Winchester, Mass. **CHARLES P. FISKE**, *Assistant Secretary*, 1775 Broadway, New York, N. Y.

1915

Remember our Tenth Reunion at Coruit? And then our Fifteenth at Marblehead was something! Now next summer brings our Twentieth. It must be a big successful party. We are faced with the necessity of needing everyone's support and help. Class dues are payable only every two years. Now is the time for you to mail back your check in the stamped envelope enclosed with my letter. I want everyone to plan to come to this big reunion. But even if you can't, at least feel the call of class spirit and loyalty and pay your dues to make this successful. Next month I shall have a report of our first committee meeting to plan for the reunion.

Everyone remembers little **Abe Hamburg**, V. He has always been active at class affairs with a loyal and enthusiastic spirit. He is an excellent example of an engineer gone wrong, as for years **Abe** has been operating a printing and engraving business in Boston. Some years ago **Abe** married an attractive girl from Palestine and this spring he went over alone to visit her family at the ancient and historical town of Tel Aviv. I saw **Abe** just before he sailed and he was very much excited and enthusiastic over his trip, which I am sure he deserves as a reward for his hard work and family devotion. This most recent letter, written on board the *Ile de France* as **Abe** returned, gives a vividly descriptive word picture

of his experiences and observations. It's a delightful letter. "My trips in Italy included a visit to Rome, Sorrento, the blue Grotto, the Isle of Capri, and Pompeii. I saw Naples and Rome with the help of friends who have lived there for years; and my visit to the ruins of Pompeii was easily worth the cost of my entire trip. But from the social point of view, I must confess that Italy made an appalling impression on me. The poverty is indescribable. It is a common sight to see people de-lousing each other on the streets of Naples, and the general regimentation of the populace is abhorrent to any person who has lived in a democratic country. . . . Conversation and discussion is limited to the weather, and there is very little difference of opinion about that.

"By contrast, I must speak of France which is not only beautiful and intensely cultivated, but unusually charming. The French people and their manner of living simply captivated me, to such a degree that I hated to leave the country after a week's stay. Paris has a great deal of beauty and interest, but it is *not gay*. You might say that I perhaps did not go to the right places for the famed (?) Parisian gayety; but I did, and even in those places I found only a forced hilarity, and no Frenchmen.

"I spent a day at Versailles, visited the Palace and the Petit Trianon and found both delightful. I was fortunate to have the guidance of a Parisian friend on all my trips in France, and being ignorant of the language, it was a great help.

"But the country in which I spent the most time was Palestine. I sailed from the Brindisi port on the Adriatic sea for Haifa. The ship was jammed with refugees from Germany and immigrants from Poland, Latvia, and Lithuania, going to seek a new homeland in Palestine. The pleasant sea voyage lasted only four days, but I had a most intensive course in political and social science, just talking with and listening to these passengers.

"Palestine is a country of contrasts. In the same place and at the same time, you see an Arab leading a number of camels loaded with sand — a primitive and picturesque procession — and alongside a huge American truck rushes by at devilish speed with a load of gravel. In most of the Palestine cities today, there is a frantic boom in the construction of homes, commercial buildings, civic improvements, and roads. American cars are used almost exclusively. The country, generally, is outstanding for its barrenness, yet there are many places of enchanting beauty. I found Jerusalem exceedingly strange, especially the city within the old walls. I spent two and one-half days on the Dead Sea, camped out on the desert of Arabia, and visited all of the richly historic places mentioned in the Old Testament. I also took a four-day trip by auto through the fertile valleys of Palestine, and visited many coöperative colonies, varying in population from 200 to 700. There are about a hundred such enterprises and most of them are successful. They appear to be

1915 Continued

well-organized, and as efficient as circumstances allow. They all have modern implements, and they employ the newest methods for land cultivation.

"The stretch of country that appealed to me the most was the road that goes over Mount Canaan from Tiberius to Safed. At a certain elevation one could see several snow-covered mountains, the Sea of Galilee, the Jordan river, and the Dead Sea. All tourists agree that they are reminded of the Alps. It was by all means the most inspiring view in the entire country. The city of Tiberius surrounds the Sea of Galilee, and this ancient city actually reeks with antiquity. I can not forget an early morning scene: the mountain shepherds milking their goats and pouring their reward into a large old Socony Oil can; then the housewives coming out to buy the milk, haggling over the quantity and the price, and creating such commotion that for a moment I expected bloodshed. But all of them gradually disappeared, and the place was quiet once more.

"In contrast to this ancient city, Jerusalem, Tel Aviv, and Haifa have modern settlements, and for an American, they are far more livable with their modern comforts. Haifa is very much like Naples in topographic appearance, but delightfully clean, and the people seem anything but poor. Abundant homes are erected with all modern American improvements. The houses are situated on the side and at the foot of Mount Carmel overlooking the harbor and the blue Mediterranean. I never realized the full beauty of the Mediterranean until I saw it from the top of Mount Carmel. If you ever visit Haifa, do not fail to see the Persian Gardens which are situated about halfway up the mountainside. An American architect designed these gardens, and he must have had a good idea of heaven. Along a beautiful 20-mile asphalt road from Haifa, I went to the old and holy Mohammedan city of Acca. No Jews or Christians are allowed to live there. The famous prison in this city, however, shows no such discrimination. The ancient sea walls have been there since the days of the Crusaders, and as you walk through the streets of Acca, you have the strangest feeling that you are living 3,000 years ago. In some places you are certain that no change has occurred since those days of yore. On the outskirts of Acca, I visited the agricultural experimental station established by the British government for the benefit of the Arab farmer. There are also a few schools for the Arabs, but they are in no sense adequate.

"I could go on giving snatches of impressions, but there would be no end to my letter. I must, therefore, conclude by telling you that on nearing the shores of the U. S. A. I am suffering from a mixed feeling of joy and regret. I am happy to have seen other countries and peoples, but I am most impatient to reach home." Thanks to Abe for giving us such an interesting column this month. Who will contribute for next month? — Remember your class dues. — AZEL MACK, *Secretary*, 72 Charles Street, Malden, Mass.

1916

Your Secretary is again forced to report lack of class news. Apparently everybody has been busy working out their salvation under their particular code. I plan to make an intensive news campaign and promise to have something more substantial for the next issue. — HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass.

1917

Malcolm Brock, formerly connected with Birge, Wood and Trubee of Buffalo, has started his own company and is now located in the Erie County Bank Building in Buffalo. He is specializing in bonds, advisory counsel work for banks and institutions, and so on, and occasionally runs across another classmate, generally Harry Toole, who is with duPont. Bob Marlow has abandoned single blessedness for married bliss with the former Miss Dorothy Amy Savage of Locust Valley, L. I.

Jeff Tutein has been named one of 15 Resident Industrial Advisers of the National Recovery Administration at Washington. His particular job is to cover the Steel, Coal, Electrical Manufacturing, Foundry, Public Utilities, and so on, codes and to endeavor in a fair and reasonable manner to look after the interests of industry within the NRA as Adviser to the Administration.

The New York Times reports that Professor Thorndike Saville, of the Department of Hydraulic and Sanitary Engineering at New York University, has been appointed executive engineer, in immediate charge of the Administration's water resources inquiry, by Secretary Ickes. Professor Saville was born in Malden, Mass., and received his schooling at Harvard, Dartmouth, and M.I.T. before joining the Engineering Corps in the Army. Professor Saville taught at the University of North Carolina for 13 years before coming to New York University in 1932 and during 12 of these years he served as chief engineer of the State Department of Conservation and Development. In 1926 a leave of absence enabled him to serve as consulting engineer of the Rockefeller Foundation in planning a water supply system for Caracas, Venezuela. — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

1918

Some time in August, Stanley Cummings of the Hoover Vacuum Cleaner research laboratories dropped into my office to leave a note which remotely resembled one brother taking a mean advantage of the amount of food in the other's mouth to twit him about his table manners. Said communiqué read: "Just dropped in to say hello, but on a fine day like this you are probably on a golf course or at one of the beaches."

Quite the contrary! I was snugly hidden from the world, nine miles from a telegraph pole and three miles from a cow (though a student found both the place

and me at three a.m. on September 12 — he wanted to discuss his thesis), snugly hidden and calculating the scholastic standing of all Technology's living distinguished graduates. Stan, for example, never knew before that he stood in the sixth tenth of the class as an undergraduate, but by the divine right of simple activity landed in the second tenth as a graduate student.

To make this record public, is, I know, to flagrantly invite the thunderbolts, but if there is any living alumnus who is listed in "Who's Who in America," "American Men of Science," or "Who's Who in Engineering" and who has an itching skepticism as to his scholastic achievements, a self-addressed, stamped envelope will clear with the infuriating truth the academic dust and smoke still hanging in the air about him. The study, insofar as I have yet had the strength to integrate it, has resulted in discoveries whose tremors may yet shake the pedagogical seismographs.

Harold Weber, who, as you will remember, went hence last fall in quest of a doctorate from Der Eidgenössische Technische Hochschule in Zürich, is back again, bringing with him Mrs. Weber, two trunks, a German accent, and some of the research technique of Der Herr Professor Doctor Guyer. The equivalent though somewhat shorter American title can now be applied to Harold. — Once again Bill Wills has demonstrated his possession of a little something we must call either magic or genius. The papers for September 19 carried photographs of two of his recent houses, both of which won honorable mention in the National Architectural Competition. No doubt the recent years have given Bill his full share of the anguish which has beleaguered the architects, but the unquenchable in him continues to flower. — F. ALEXANDER MAGOUN, *Secretary*, Room 4-136, M.I.T., Cambridge, Mass. GRETCHEN PALMER, *Assistant Secretary*, The Thomas School, Wilson Road, Rowayton, Conn.

1920

Just as I was about to send in these notes Buck Clark stopped in for a friendly chat. Of course, I got after him for news of classmates around Hartford, but the most important thing we talked about was the fact of our impending 15th Reunion next spring. We hope to have some informal luncheon gatherings this fall and you may be sure that I shall keep you informed as to plans. At any rate, it isn't too soon for every member of the class to be thinking about this and figuring to help make it the best Reunion yet.

Buck informed me that Jack Coyle became a proud father of a boy arriving early this summer. Baker of Course II is connected with the Union Light and Power Company of Hartford. We learn that Norrie Abbott has been vacationing in Bermuda.

I have a couple of belated but interesting items. The first, relative to the marriage of Jack Logan to Miss Anna Perry Durand, daughter of the late

1920 Continued

Elias J. Durand, formerly Professor of Botany at Cornell University. The marriage took place on June 23 and Mr. and Mrs. Logan are now at home at Edgewood, Pittsburgh, Pa. — The engagement of Francis Sears to Miss Mildred Grace Cornwall, a graduate of Simmons College, was also announced last June.

Fraser Moffat has left Pasadena and is now with the U. S. Industrial Chemical Company, 60 East 42nd Street, New York. T. F. Harvey is now located at 553 Washington Street, Gloucester, Mass. Ed Van Deusen's new address is 1815 San Marino Avenue, San Marino, Calif. Grafton Owens has been located at Columbus, Ohio, address 3044 Indianola Avenue. Roger Moss crop is still up in New Hampshire, address 1077 Union Street, Manchester. John Lucas is back in New England — in East Norwalk, Conn., to be exact. Harold Kepner is at the Utah State Agricultural College, Logan, Utah. Alfred Hand has moved from New Jersey to Washington, D. C., 3412 O' Street N.W. Phil Byrne is with the Standard Oil Company of New Jersey; their Radio City offices in New York. Ted Bossert's new address is 1541 Asbury Place, Pittsburgh. Ken Akers' new address is 520 Commonwealth Avenue, Boston. Phil Young of Course X is living in Westfield, N. J. Arthur Morley has left the South and is now in Cicero, Ill. Frank Lawton is in Houston, Texas, 2624 Oakdale Avenue. Malcolm Howe has gone to Bucksport, Maine. Erwin Harsch is in Knoxville, Tenn., 1731 Laurel Avenue. Merton Hall has moved from Texas to West Bend, Iowa. Raymond Coward is now in Red Bluff, Calif. Frank Hopkinson may be reached at 779 Harvard Street, Rochester, N. Y. Ed Burdell is back at the Institute with the Department of Economics and Social Science. Paul Patterson is back in Boston as a Financial Expert for the John Hancock Life Insurance Company.

Keep that 15th Reunion in mind! — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

1921

Again it becomes our sad duty to report the most untimely passing of a member of the Class. It seems only yesterday that we periodically saw Reginald Geddes Burr, VI, on his trips through New York. Then, during our prolonged absence from Gotham, we only occasionally heard of Reg who was achieving more laurels in a new field. A true friend and a loyal classmate has gone and it is with a heavy heart that we reprint an editorial from the June 15, 1934, issue of *Bus Transportation*: "On June 2, Reginald Geddes Burr, assistant editor of *Bus Transportation*, who for the past three years has had his headquarters in St. Louis, died of peritonitis after an operation for appendicitis. This is a severe shock to his many friends, particularly to those with whom his duties as an editor brought him in contact. He was a well-informed student of transportation matters gained through years of operating experience in Texas and Florida and an

extensive contact with many bus operating companies throughout the Middle West since joining the staff of *Bus Transportation* in 1930.

"His death is a loss both to this publication and to the industry, as can be attested by the many favorable comments on his articles which have appeared in *Bus Transportation*. Burr was a young man, still in his thirties. Born in Hingham, Mass., 36 years ago, a graduate of M. I. T., and later of Stone and Webster's training school, he had the persistency characteristic of the New Englander, the knowledge and background necessary to interpret the increasingly complex trends in highway transportation. His work had just begun — his great opportunity was before him. By training and experience he was a keen observer and a forceful and able writer. Popular with his many friends and associates, his all too sudden passing after only a week's illness, leaves a place in the transportation publishing field that belonged to Reg Burr." — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, South Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, 10 University Avenue, Chatham, N. J.

1922

We are glad to congratulate Al Brown, who is now with Montgomery Ward, headquartered in the executive offices in Chicago in charge of the paint division. — Carl Grip is associated with Minot, Kendall and Company, at 13 Congress Street, in Boston. — Dex Shaw has been admitted to membership in the firm of Houson and Houson, Patents, Trademarks, and Copyrights. Dex makes his headquarters in Philadelphia.

In the late spring the engagement was announced of Frances Maddaux Kinney to Charles Tyson. — Early in the summer the marriage was announced of Irene Gantzer to Vernon Whitman. Vernon is the President of the Miniature Camera Club of New York, and is a radio engineer with the Hazeltine Service Corporation. — An early fall wedding was that of Mary M. Halpin to John Halpin.

Harvey Edwards is plant engineer at Flint Unit No. 1, the largest plant of the Fisher Body Corporation. He and his wife are making their home at Flint, Mich.

I wish that there were more news items to send of other members of the Class. Better luck in future issues for the new Secretary. After spasmodic efforts to give you interesting notes regularly for the past four years, I have finally found it necessary to tell Heinie even such efforts, poor as they were, must end. I do this regretfully, for if there were sufficient time, the opportunity to communicate with various members of the Class and gather together interesting bits of information regarding their activities for your edification would be delightful indeed. Much success to your new Secretary, who should be announced shortly and who will undoubtedly contribute to the next issue of *The Review*. Make an

THE TECHNOLOGY REVIEW

early New Year's resolution and give him a boost by writing to him so that he will get off to a flying start. Best luck to you all. — RAYMOND C. RUNDLETT, *Retiring Secretary*, Curtis Publishing Company, 42nd Street, New York, N. Y.

1923

C. P. Thayer, VII, is Executive Secretary of the Manchester, Conn., Y. M. C. A. — Harry L. Thompson, I, writes: "I reported for work at the U. S. Bureau of Reclamation, June 1, leaving the Middle Rio Grande Conservancy District at Albuquerque, N. M., where I had worked the past seven and one-half years. I am located at the Denver office where there are several M. I. T. men." — C. H. Tirrell, I, says: "I have had a number of business changes in the last few years. From building construction I went into essential oils and am now with Shell Eastern in their Brooklyn plant."

P. J. VanAlstyne, VI, writing on the stationery of the Field Service of the Office of Indian Affairs of the U. S. Department of the Interior, from Toppenish, Wash., has an interesting report: "Last fall and winter, I was appointed engineer for the E. C. W. camps located on the Yakima Indian Reservation, of which there were six. The appointment led to further responsibilities, and, the first of May, I was made Road Supervisor on the Yakima Reservation under the PWA. We are building roads through new, unsettled country and are certainly finding lots of variety in terrain for the work. Mountains, hills, valleys, rivers, and all don't mean a thing, for the roads are laid out on the section lines and there they must go."

J. A. Weaver, VI, reports that he is now with the Florida Public Service Company at Orlando, Fla., a city of whose charms he speaks glowingly. He is in the gas sales department, which is devoted to modernizing kitchens with the latest type gas appliances including refrigerators and water heaters. He was for three years previously with Sears' retail stores, having been in charge of electric sales departments in stores in Tampa and Orlando. — Phil Wilder, XV, is Assistant Professor of Education and Secretary of the Alumni Association of Bowdoin College, Brunswick, Maine. — J. Curtis Willson, XV, writes from San Francisco, where he says he is located, temporarily at least: "Late last year I joined Greig, Blair and Spight, Inc., a national organization of radio station representatives. I was sent out from the mid-west territory, working out of Chicago, to the West Coast."

I regret very much to report the death of Walter B. Murdoch, XV, in the Newton Hospital in July following an operation for appendicitis. He had been for some years with the Stanley Rule and Level Plant at New Britain, Conn. — Eltweed Pomeroy, XV, says the alumni office hasn't liked it much because he can not give a permanent address. He says that last May he accepted a position as auditor with the Kansas Flour Mills

1923 Continued

Corporation, which will mean that he has to travel over Kansas and Oklahoma, visiting various mills belonging to the company.

I gather from Rally Rubins, I, that he feels more or less marooned as a PWA Engineer-Inspector in Glencoe, Minn. "The other news," he says, "is that there are two children, one of each, now being brought up with reasonable success on corn and wheat straw, but we hope that they know what a subway looks like before many more years." — What a far-flung bunch we are is exemplified by the next item, which concerns Marvin Eich-enroht, VI, who reports that he is now practising architecture by himself in San Antonio, Texas.

O. William Lowry, II, writes: "I am now engaged in the furniture business, having started up a small factory here in Holland, Mich., the firm of Charles R. Sligh Company. We have been manufacturing bedroom furniture and household desks, beginning last November. We have already developed a business employing 60 men, have shipped our furniture into 43 states and have been able to keep our plant operating at full capacity, from the start on a profitable basis. I have two children, Billy 8, and Anne 5. My main outside diversion is sailing, which is a very active sport in these parts."

A. G. Ashcroft, Army Ordnance, is located at White Plains, N. Y. He is Product Engineer of the Alexander Smith and Sons Carpet Company, of Yonkers, and in charge of product research, development and control. — Major J. D. Arthur, Jr., I, writes: "On April 1, 1934, War Department orders relieved me as District Engineer in Washington, D. C., and directed me to Zanesville, Ohio, where I am now District Engineer. This district was created to handle the Muskingum Watershed Conservancy Project, a flood control and water conservation project which will involve the construction of 15 dams at a total estimated cost of approximately \$35,000,000. I expect to be here for the next two or three years in connection with this work."

L. W. Powers, XV, is now Special Agent for the Buffalo Insurance Company, with offices at Philadelphia. — Simeon V. Kemper, Jr., X, is employed by the Recreation Department of Los Angeles City as one of the recreation directors. He lives in Alhambra, Calif. — Tom Drew, X, who has been since graduation on the instructing staff at the Institute writes: "I have allowed myself to be persuaded that industrial research is better than teaching, and I am now attached to the staff of the duPont Experimental Station at Wilmington, Del., as a chemical engineer. This summer my family was increased by the birth of a second daughter on July 27, but beyond this I have no news to offer."

And just in time for these notes comes the announcement from Jim Robbins, I, of the birth of a daughter, Sara Andrews, on September 15. Jim is with the Newark School of Technology. — HORATIO L. BOND, Secretary, 195 Elm Street, Brain-

tree, Mass. JAMES A. PENNYPACKER, Assistant Secretary, Room 661, 11 Broadway, New York, N. Y.

COURSE VI

Bill Glendinning hasn't been heard from in this column for a long time. Let's look him over. Bill taught in the Electrical Engineering Department at M. I. T. for five years. Then he tripped South and joined up with the Philadelphia Electric for a year. With that taste of commercial life, he came part way back and landed in the Brooklyn Edison Company, where he is still doing time as an instructor. That title means conductor of classes in whatever needs to be learned by employees of the company — science, engineering, or just plain job betterment. In addition it means leader of foremen's conferences, straightening out difficulties, and making the whole machinery smoother running. Bill enjoys his job and looks well. He is married, has a boy two years old, and lives at 164 Parkside Avenue, Brooklyn.

If you haven't heard from George Tzougros lately, it's because he has almost pulled himself apart in tractive effort with the Board of Transportation of New York City. George is superintendent of substations for the Independent Subway System in the big city. If the train suddenly quits, it's good to know to whom to call. George conducted your correspondent through some of the substations beneath the sidewalks of New York, silent dungeons filled with huge 12 phase mercury arc rectifiers. These sunken stations keep themselves and the trains going nicely, all automatically controlled, with little lights ready to go on in the central control room if anything goes wrong. To get back to George, he was married last November and lives at 2720 Grand Concourse, Bronx. He looks mighty well, too, quite a bit heavier than in the old training-down days. — ALBERT J. PYLE, Secretary, 6802 Ridge Boulevard, Brooklyn, N. Y.

1925

William Baxter Bader, X, who was employed by the Semet-Solvay Company as a chemical engineer, was killed in the crash of a transport plane on June 9 at a point in the Catskill Mountains near Livingston Manor. Without going into details as to the accident, I give herewith a letter which I have since received from a close friend of his, C. D. Grover '22, former President of the Buffalo Tech Club: "It is with great sadness that we report the death, on June 9, of William B. Bader, who was killed with all the passengers and crew of a plane en route from New York City to Buffalo. Mr. Bader graduated in Chemical Engineering, taking a master's degree in 1927, from which time on he has worked for the Semet-Solvay Company in Buffalo. He is survived by his wife and a ten-months-old son. Mr. Bader was an active member of the M. I. T. Club at Buffalo and his untimely loss will be keenly felt."

The Boston Transcript of August 29 reports that Professor Glennon Gilboy will be one of those engaged in work of

the Engineering Foundation in special research on the supporting power of earths and foundations. — Temple C. Patton, V, has been appointed to the staff of Worcester Academy. He will be instructor in science and mathematics and, reminiscent of his connection with the Glee Club and Musical Clubs Orchestra, director of work in instrumental music and of the orchestra.

Franklin W. McLaren, VI-A, married Ursula Josephine Murphy in San Francisco. D. D. Donald, also of VI-A, was best man. — Scott Emerson, X, was married on June 30 to Miss Mildred Lee Hobbs of Charlotte, N. C., in the Fifth Avenue Presbyterian Church, New York City. The couple will live at 156 East 37th Street. — Robert R. Crosby, Jr., IV₂, was married last March to Miss Eleanor Ripley, daughter of Mr. and Mrs. John W. Ripley of Flushing, L. I. — HOLLIS F. WARE, Acting Secretary, 16 Smith Avenue, Reading, Mass. HENRY V. CUNNINGHAM, JR., Secretary, 43 Chestnut Street, Boston, Mass.

1926

In the front section of this issue of The Review is a description of a new calculating machine for solving those simultaneous equations which some of us struggled over in applied mechanics and structures. Bud Wilbur, who now labors under the title of Assistant Professor in the Department of Civil Engineering, has been working out the device. — Among other '26 men here at the Institute might be mentioned Charles S. Draper, Research Associate in Aeronautics, and Manfred Rauscher, Assistant Professor of Aeronautics. Draper has been doing some notable work in the study of flame propagation in internal combustion engines. — Tom Green, diligent Secretary of the Hartford Technology Club, is now with the Hartford Empire Company in Connecticut.

The following piquant address belongs to Alfred W. French, Jr.: 320 Boone Street, Piqua, Ohio. — Stuart John is with the Dallas (Texas) Power and Light Company. — Robert W. Rogers is now living in Leominster, Mass., having removed from Winchester. — Elmer C. Warren resides in Waterville, Maine, and Robert S. Williams in Chattanooga, Tenn. — Sidney Brookes, continuing his steady career with the Public Service Electric and Gas Company, may be reached at 80 Park Place, Newark, N. J.

Summer and fall hath victories no less renowned than spring. On July 4 Le-Baron Carleton Colt was married to Miss Frances Jackson Reynolds, daughter of Senator (N. C.) and Mrs. Robert R. Reynolds. They were married at Virginia Beach. — On September 8, Rufus S. Wilson, Jr., of Newton, was married to Miss Ada Prescott Folwell of Montclair, N. J. — J. RHYNE KILLIAN, JR., General Secretary, Room 11-203, M.I.T., Cambridge, Mass.

1928

John Melcher recently dropped in for a visit and mentioned that he is working out of Philadelphia for Leeds and

1928 Continued

Northrop. His territory includes all of New England. John passed along the following interesting information about other members of the class. — Nort Case of Course VI has joined the ranks of the very proud fathers, for his family now includes a bouncing baby girl. Nort is a transformer engineer with the General Electric Company in Pittsfield, Mass.

Our Hawaiian representative, Paul Johnson, has continued his connection with the General Electric offices at Schenectady. He has specialized in the application of electrical controls and motors to textile machinery, and his territory includes most of the Atlantic Seaboard. — The next time your wife bakes in Pyrex glassware, think of Tom Wood, who is now assistant to the factory manager, Pyrex Division, Corning Glass Company, Corning, N. Y. The Tom Woods have two youngsters, a little girl about a year old and a young man of three, who is named Thomas Stacy Wood, III. — GEORGE I. CHATFIELD, *General Secretary*, 5 Alben Street, Winchester, Mass.

COURSE VI-A

No news may be good news, but it is also exasperating; and I have been in a state of exasperation for some time. Nature has a way of occasionally correcting that condition. On arriving home from vacation, an announcement told me of the marriage of Hennie Wengen to Miss M. Edith McDermott. It all happened on August 4, 1934, at Poughkeepsie, N. Y. The new address is Manchester Road, Poughkeepsie. Congratulations, Hennie, and best wishes from the gang to you both.

And another letter brought some more news. This letter came from Niagara Falls and it announced the engagement of Pete Zugale to Miss Gladys Schoen; again the gang says congratulations and best wishes. The only thing that has been bothering me is where Pete and Gladys are going on their honeymoon. Now if any of the rest of you fellows have "snuck" away and got married, let me know about it, will you? That's all for now. — HUYLER B. ELLISON, *Secretary*, 41 Wallace Street, Freeport, N. Y.

1932

What is the news as we start out on our third year in the big world? I am here to act as a forwarder of any information that comes this way. You all realize, however, that it is impossible for me alone to make these notes of much interest. The cooperation of everyone of you is needed. With this annual admonition, I will set forth what little news has come my way. — On Saturday, September 15, John C. Lyon was married to Margaret A. Vansant. He is still with Budd's and is living at 725 Stradone Road, Cynwyd, Pa. — Since the first of July I have been working for Pathé Exchange, Inc., in their film laboratory at Bound Brook, N. J. My work is so varied that it can best be described as a one-man research department.

Rolf Eliassen sent in the following two items: "Mr. and Mrs. Carl Herman Biorn announce the marriage of their daughter, Lucille Virginia, to Mr. Richard Benjamin Smith (I), on Saturday, September 1, 1934, St. Paul, Minn." Good luck, Smitty. — Chayabongse, XI, has been studying rural sanitation in Porto Rico and the states of the South. In October he leaves for Siam to apply his knowledge of sanitary engineering to the problems of Siam.

How about sending a penny post card with some interesting dirt. Yes, you. — CLARENCE M. CHASE, JR., *General Secretary*, 539 Central Avenue, Bound Brook, N. J.

COURSE III

I promised last month to have something in The Review this month on the changes that have taken place in our department back in Cambridge. Some of the men we knew have left, and a number of others have taken their places. Professor Pratt is in charge of metallography at the American Steel and Wire at Worcester, and it just happens that he is under Marske who was doing graduate work at the Institute when we were there. He is in charge of all research work there, I believe. Walstead and Johnson both have left, but their whereabouts I do not know.

On the other hand, the Department of Mining and Metallurgy has absorbed the Department of Electrochemistry, including our old friend, Professor Thompson, and George Swift. That makes electrochemistry and ceramics both in our department, whereas they were separate back in the days when. Another old friend is back in the person of Ted Graves as an assistant. Then there are a number of new names: Francis Bitter, Ph.D., Associate Professor of the Physics of Metals; J. B. Waterfield as lecturer; C. L. Norton, Jr. (that gives us three Nortons now — I hope they are not triplets) and I. MacL. Symonds as instructors; and G. J. Blair, T. E. Graves, J. R. Long, F. R. Milliken, Jr., and C. P. Stratton as assistants. The list of professors remains unchanged except those mentioned above. I understand also that Professor Zavarine has a new heat treating lab in Building 8 that is right up to the minute. Our best wishes go out to the heads in the management of this enlarged group and organization.

A letter from Tom Hannafin reports his having gone to work at the Ohio Works of the Carnegie Steel Company at Youngstown the first part of May. He had a long wait, but it came at last. He is doing observation work the same as I am and in the same company, and I hope he finds it as interesting. Metallurgical control is becoming more and more important. He is lucky at being in Youngstown also because he has Curtin as a room mate.

I received a letter from Keskulla this summer with the startling news that after two jobs in the far, far west, he has taken up abode near Elizabeth, N. J., at Westfield, and is working in the Garwood die-casting plant of the Aluminum Company of America. Lead going pretty

slow, he looked for a chance to change, and found one, so he is back a little nearer our midst. He started at the beginning of July in the laboratory running routine analyses but getting acquainted with their raw material and products, and he expected to be moved to the foundry early in August. There is a drawback, however, to this nice story about Kes in that "there is a notorious lack of eating places" as he puts it, except dog carts. Tough luck, Kes, but let us suggest a nice wife as a good means of escape. (How about it, Bearce?) He also says, just as he moves east, that the west is the only place where sane, sensible people ought to live. I agree with him except that I should change the "ought to" to "do."

Speaking of Bearce, it is somewhere between him and Haynes now for the location farthest west. We will go around the other way for Orne. A second letter from Bearce gave us the desired information: It was Miss Rebecca Clough whom he married in April, 1933. He says many men are leaving the mill to get to a lower altitude for the coming winter, so he hopes there will be a change for him. He and Haynes have opened up some new placer ground, have the dead work finished, and were getting a sluice box, dam, and road built. By now they ought to be digging pay-dirt. — Since the last writing Haynes reports having a job with the St. Joe Mining and Milling Company of Boulder, Colo., landed last May. They have a mill and several mines in Boulder County. He is doing minor engineering work, with a great deal of different kinds of surveying, digging up claim corners, staking, and so on. Work is heavy, but he claims that he is in a happy mood, and enjoys an occasional beer picnic. What more is needed?

Demas has appeared on the horizon for the first time in quite a while. He is a member of the timber and construction gang at the Scrub Oak Mine of the Alan-Wood Mining Company at Dover, N. J. He started last May also. He gets an opportunity occasionally for other phases of underground mining also. Magnetite is the particular mineral they are interested in, and he finds the whole work varied and interesting. Great work! — Berube is still with Noranda, and is probably digging in for another good winter. — And so, gentlemen, 1932 forever! — HENRY J. CHAPIN, *Secretary*, Y.M.C.A., McKeesport, Pa.

1933

Here's a few odd items which have been directed my way: From the Boston *Globe*: Ed Peterson has been appointed as town manager of Washburn, Maine, and is believed to be the youngest town manager in the United States. The town manager of Washburn is also tax collector and, unless otherwise ordered by the Councillors, he has charge of all other departments except the schools. — Cal Mohr is now working in Buffalo and his address is 23 Crowley Avenue of that city. — A line from Frank Lopker tells me of his illness this summer and an en-

1933 Continued

joyable summer as a convalescent. He is again back in shape and will have more to say about himself next month. We are pleased to read of Bob Hentschel's being awarded a scholarship at the Institute for another year of study. — Dave Lee is now with Chrysler in Detroit. — The various branches of the Chase Companies are fighting for the services of Charlie Bell. — Pearson is with Colgate-Palmolive-Peet in Jersey City.

A recent announcement I received tells of another Course XV man making good. You just can't hold those fellows down. Walt Duncan is just about running Procter and Gamble out there in Cincinnati and has decided to settle down to the peace and quiet of married life with the former Janet Smith as his helpmate. Congratulations, Walt, and lots more good luck. — Another announcement recently received tells me of the arrival of Peter Fairfax Payne at the home of Mr. and Mrs. Charles F. Payne. Congratulations. — GEORGE HENNING, JR., General Secretary, 163 Barbey Street, Brooklyn, N. Y.

COURSE VI-A

I understand from reliable sources that all of us have not yet started to earn our first million dollars, but after hearing from the same source that all of last year's VI-A group are making the sweat fly, it looks as though those who have not yet landed jobs are just trying to decide which type of work to take up. Did I hear some VI-A man say that he wished that he had taken XV?

Newland Smith is working in the television development laboratories of Philco, in Philadelphia, and says that there are quite a few Tech men in Philco, including Ray Bowley, VI-A '30, another televisionist. (Do I coin a new word, or do I?) It flowed off the typewriter keys just as easy as a mistake does! Smithy says that they are getting excellent television pictures, using cathode-ray tubes, which is his specialty, and goes on to say that "Mal Masters came around to see me this week. He was in Philadelphia for a few days looking for a job, and is on his way out to Chicago to see the Fair, and look up other job prospects. He was planning to stop in Fort Wayne to visit Feustel."

Rahmel has had a busy and very interesting summer, what with spending "two months cosmic-riding with Dr. Bennett and Gordon Brown in the West (near Denver; Mr. Evans to be specific)." He is now working for some company in Chicago, on relays and vacuum tube amplifiers.

Millard worked for a time as a splicer's helper for the New York Telephone Company down on Wall Street, N. Y. C., and then, perhaps influenced by all the wires in the big telephone cables down there, left that job to take one with the American Steel and Wire Company. Hiatt, I hear, is in the Eastman Research Laboratories, at Kodak Park, Rochester.

Dick Fossett is out at the Procter and Gamble Company in Kansas City, after spending an enjoyable vacation on the

golf course, and you should see the tan that he managed to acquire this summer. He was originally slated to go to St. Louis, but last-minute orders changed his destination.

At about the same time that Dick left Albany for Kansas City, two other VI-A men arrived near there, in Schenectady, to seek their fortunes at the General Electric Company. T. Johnson beat Harris Thompson there by one week, and I've seen both of them on visits to Albany. They are working on the "test", so familiar to G. E. Option men, and plan to take the exam for the Advanced Course on September 17. They tell me that Zimpel was around Albany this summer, but they didn't see him.

Hugh Davis is the latest member of the bunch known to have taken the marriage vows, and is living in bliss, with a good job, near Chicago; no you don't know the girl!

I took a hurried trip to Boston, a couple of weeks ago, to see old friends and again trod the cool, well-washed halls of learning. Saw Professor Wildes, who gave me various interesting news items, ran into K. A. H. Smith and Charlie Miller, but clean forgot to ask what they were doing at Tech in the middle of August. I am still working in the Construction Department of the New York Telephone Company, with all of Central New York state as my stamping grounds, but at present am sticking pretty close to Oneonta and occasionally to Binghamton. Am working as helper to a splicer and trouble-shooter, which gives me an opportunity to use some of the Plant Orientation Course training enjoyed by the Telephone Option down in N. Y. C. three years ago, and also gives me a chance to use the various modifications of a Wheatstone Bridge in locating troubles; lots of fun! — JOHN F. LONGLEY, Secretary, Construction Department, N. Y. Telephone Company, Binghamton, N. Y.

COURSE XVI

Hello, Club Sixteen! It seems as if Cupid is starting a massed attack on our ranks, and look who he's picking. First, there's Eddie Morris. Eddie has been working at Curtiss for a year in Buffalo, but has just joined the Institute staff as assistant in the Automotive Laboratory. However, Buffalo had a profound effect on Ed, and I understand he's now engaged to a young lady from that city. And speaking of Buffalo, Charlie Mac was in Boston on vacation, over Labor Day, to celebrate his first anniversary — remember? He now has the title of Chief Propeller Designer of Curtiss. Good boy, Charlie!

You'll never guess who else has succumbed to the prospect of a quiet married life. Believe it or not, Howie Sargent left the bachelor's ranks sometime in September. It's a Hartford girl and yours truly thinks he's a pretty fortunate young man. Howie's still with United. Anyway, the best of luck to both of you, Howie.

Your new secretary has joined the staff of the Institute as research assistant, specializing in vibration. Both myself

and Ben Smilg received S.M. degrees last June. I spent part of the summer helping Professor Markham teach summer sessions. Jojo Alkazin and I had the Hartford end.

A. M. Patterson arrived in Cambridge for a visit in July after a very interesting and instructive year in Europe. What stories he can tell! C. W. Sweetser and Ed Rohn have been in town lately. Converse is working in the shop at Grumman Aviation in Farmingdale; Ed has been working on sales and in the shop for International Time Clocks. Late in August he started canvassing aircraft firms for a position by private airplane at over 200 m.p.h.! He's out of our class.

The C.C.C. is still harboring Mike Sampas. He was around about two months ago, and looks in the pink. Frankie Mac was working for Boston Consolidated Gas at the latest report. Waco closed down on engineers. — Bob Shepherd was selling refrigerators and automobiles in West Virginia some months ago and thinking of teaching aeronautics in a school nearby. So far as I know, Gus Martin, Bill Sheppard, Ed Foster, Clare Farr, and the rest of the Philadelphia crowd are still at Budd's.

In closing, I'd like to state that the failure of Club Sixteen's paper is due to the inadequate number of replies. Anyway, I'm in Building 33 for another year and I'll at least exchange letter for letter, so let's hear from you. — GEORGE P. BENTLEY, Secretary, Building 33, M.I.T., Cambridge, Mass.

COURSE XVII

Note: Through no fault of Beau's these notes are rather old; but it may still be news to some. Sorry to have delayed these, Beau. — G.H. Jr.

Letters from Tom and Ed this time, and at these last reports they are both at the same thing as before. Tom is working for the town of Haverhill, or maybe it is a city, and Ed is hot after the alterations and additions business down Philly way. Looks now as if I'll be in Virginia forever. Of course both Tom and Ed are quite apologetic about not writing sooner, but they haven't a thing on the rest of you about writing. Come, come now, write Beau a letter.

The dope on Sully finally seeps through, via Galvin; he got so good figuring brickwork as a sub for one of the Cambridge general contractors that in self defense the builder hired him. So, and therefore, Mr. Sullivan now dignifies the title of estimator in the firm of Edmund J. Rappello Company, Building Construction, of Cambridge. Prior to his accepting his new job, Sully was carrying on in the masonry sub-contracting work of his father and brother. Tom reports that Gene is getting lots of experience and a good start . . . to what, he doesn't say, but we guess it means up the ladder.

As for Galvin himself, he says he has a decided preference for blondes and heartily commends Neil on his choice (see Technology Review, April). At the time his letter was written he was with a party making a topographic map of the section

1933 Continued

of Haverhill, and while the work was interesting and probably good for that something one gets with experience, he was finding it a bit monotonous after the first few days of each type of work.

Ed Rowell carried on in his letter about the place he works, telling how the big boss (age 67) takes the stenog (age 35) to lunch and he gets the use of the company typewriter — and stationery, I suppose, though it isn't a letterhead. Ed reports the alterations business coming along fairly well in the fair city of the Quakers, and he has hopes of getting to Boston again one of these days before finals come along. If he got a job, he was going to ask the head man for a few days off and make the trip . . . maybe by now you fellows in and around Boston have seen him.

It's been a year now since we pulled out of Tech and just one surely made changes in things for all of us, I suppose. Galvin writes that when he went back for Open House, everything about the Institute had changed in some indefinable way. Maybe it was homesickness, maybe something else, but anyway things had changed. It's queer to go back and find that we are no longer taking an active part in everyday affairs of school, that someone has taken our places. It was noticeable even last fall at Thanksgiving for me. You have felt it, too, if you have been back. A whole year, and how we have scattered and what things we are doing! Tom, Sully, Rowell, and myself are already accounted for. Jim is still around Boston with Whittier on the maintenance and alteration of buildings; Don is with the Construction Quartermaster in New York City and working on Governor's Island; the Colonel I've had no word of in a couple of months, but at the last report he was doing painting work; Crane is selling bronze, aluminum, and such; and Coop is, or was, with the Coast and Geodetic Survey somewhere in Missouri.

So much for this month. — BEAUMERT WHITTON, *Secretary*, Southeastern Construction Company, Box 173, Hampton, Va.

1934

From Rochester comes word that Phil Kron is working in the Training Department of the Eastman Kodak Company. He is doing accounting, which is a far cry from civil engineering. His evenings are quite taken up (yes, you've guessed why), but he expects to take some courses in business training and economics during the colder months. Phil is also responsible for the information that Butch Patch is wandering up and down the eastern seaboard inspecting welds for the Linde Air Products Company. Bob Emery, so the story goes, is all set to tackle business through a training course at Macy's in New York. Gordon Day, when last seen, was burning up the road to Northampton — and Smith. He'll probably be back at the Institute this fall finishing up, since that is the closest he can get to

Northampton and still have the pretense of working.

I know as much about Dick Bell now as when I left Tech last June, and that is that he is in charge of a gang of men in the construction of a mill adjacent to the clay pit at which he is working in Gleason, Tenn. Others in Course III include Bob McIver, who was last reported to have hit the trail for gold in Arizona. Frankie Milliken can be found at school, where he is an assistant in the Mining Department. I saw him last week when he came down to Dover, N. J., to assist in the course given at the summer Mining Camp. Ralph Geil has been down taking the course at camp, this being all that stands between him and a degree. Brad Hooper has definitely abandoned mining for ceramics. He has been working for Professor Norton in the latter's ceramic laboratory.

From Hank Backenstoss came news of all those fellows who visited Chicago during the summer. Hank has been running the Tech exhibit at A Century of Progress. Forty-two members of the class visited and registered at the booth, which was in the Hall of Science. Hank will be there for about six more weeks before he starts on his way East to begin the "fall term." Johnny Barrett has been doing the town with Hank, the former having a metallurgical job in Chicago Heights. Both King Crosby and Wing Lem have been spending the summer at camp as councillors. Art Fox is with the Eastman Company. Jack Chesterman is with the Bell Telephone Company in New York. Gordon Burns and Jim Eder spent some time hiking in Vermont early this summer. They did a lot of trout fishing and went hunting for porcupine. Nohl, the chap who was going to do the diving for the Seth Parker expedition, dropped in on Hank in Chicago. He came back after the cruise broke up in Haiti. Among the others at the Fair were: Dick Bell, Bob Ghelardi, Bob Eck, R. M. Haines, Duke Haseltine, Dave Ingalls, Po Ting Ip (Pete to you, who was on his way back to China), Johnny Streng, and Butch Struck.

Joe Seligman and Don Lister have both been taking it easy in preparation for entering law school. Joe is going to Yale and Don to Columbia. Joe was at Fortress Monroe, and from there went down to Pensacola, where he admits he did some high-powered loafing. He wrote to tell me that Ed Bromley was married on June 16 and went abroad on his honeymoon. Congratulations, Ed. I believe you're the first in the class. He is now back in Philadelphia, where he is working with his father. — Ivar Malmstrom underwent a hurry appendicitis operation in Washington while on his way back from South Carolina. Jack Dunning is with the U. S. Rubber Corporation and Bill Spreen is with the Wood Newspaper Machinery Company in New York.

Herb Lidoff has finally landed a job with an auto accessory house in Washington. After the way he frequented such

THE TECHNOLOGY REVIEW

places in Boston in search of parts for good old Aristotle III, he figured he would do better in this work than in chemical engineering. Ed Chiswell is an assistant at Bangor. As for some of the other chemical engineers, Herb Andrews is with the Chemical Construction Corporation, Jim Parker is with the Bigelow-Sanford Carpet Company, Ted Stackpole with U. S. Rubber, Ted Kresser with Bosch in Springfield, and Sam Rulon with the American Bemberg Company at Elizabethton, Tenn. Choo-Choo Moore may still be called by that affectionate name, having entered the service of the Pennsylvania Railroad as a computer. Connie Chase, Earl Murphy, and Ken Ryder were last reported to have been in the Canal Zone in the employ of the Panama Canal Service.

Course XVII has been scoured by Bob (M.) Becker. He is working at school for Professor Voss in the latter's Masonry Materials Research Lab., "trying to keep brick walls from leaking." Frank Cosgrove has retired to the Cosgrove farm in Westboro, Mass., where he is devoting his time to raising corn and keeping the cows out of his neighbor's flower garden. Sam Crew is working with his father's outfit, the Crew Builders Supply Company, in Norwood, Ohio. Brad Ellenwood is another who is working with his dad, the latter being a building contractor. Joe Fishman is working as a postal clerk in Boston, while "Obie" O'Brien is working at Wellesley College. Wrong again! He is only acting as an inspector for Professor Voss, who is a consultant on the job of erecting a new building there. Rumors have it that Vincent Rother is either going to Cornell to study architecture or to China with a ceramics outfit.

A couple of names that have slipped my mind are Charlie Lucke, who is working in Brooklyn doing some machine designing, and Bill Wessel, whose last letter in full was this: "I ketchum job. Believe it or don't. Buffalo Placers Corporation, Dillon, Colo. Leaving next week. Bill."

As for myself, I haven't done so badly. Got a job around the middle of June with the Alan Wood Mining Company at their Scrub Oaks Mine in Dover, N. J. Yes, by all means, they do have mines in this part of the country, and it makes it easy not only for me to go home often, but other places as well. The catch to it all is that I am not yet the boss, but merely a second class timberman in the mine, which in ordinary language is lower than assistant to the helper's assistant.

But wait. I take it all back. You might call this a deadline story, because it has happened just as I was about to send this off, and it is that I am once again unemployed. The mine shut down tight on September 21, with only a pumpman, a hoistman, and three watchmen being retained. So now you can write me at my home address again, because that is where I'll be until I find something again. — ROBERT C. BECKER, *Secretary*, 43-20 30th Avenue, Long Island City, N. Y.